AROUND THE WORLD IN NINETY-ONE HOURS (See Page 6)

MODEL AIRPLANE NEWS

OCTOBER 1938
20¢

TO OUR MANY DEAR PATRONS:

In a small way, February, 1935 the firm of "BURD" made its first appearance internationally.

"LET'S LOOK *at the* RECORD"

There was nothing to distinguish this entrance into the industry from many others made at the same time; however, here was one destined, in the short space of little more than three years, to take its place as *the leader* in the most fascinating of all hobby crafts. It may be pointed out that fortune smiled favorably on us, still, we pride ourselves in our spectacular growth, knowing we constantly strive to give you model builders the type of products you expect to get.

Our rapid advancement has, at times, been difficult. Picture for yourself our problem as month after month we increase production and find ourselves still unable to meet the demands made on us by the consumers of "BURD" products. Early in 1938 we began to plan for expansion that would enable us to fulfill the expectations of our friends. Now—we have completed our expansion and wish to announce our removal to new quarters at

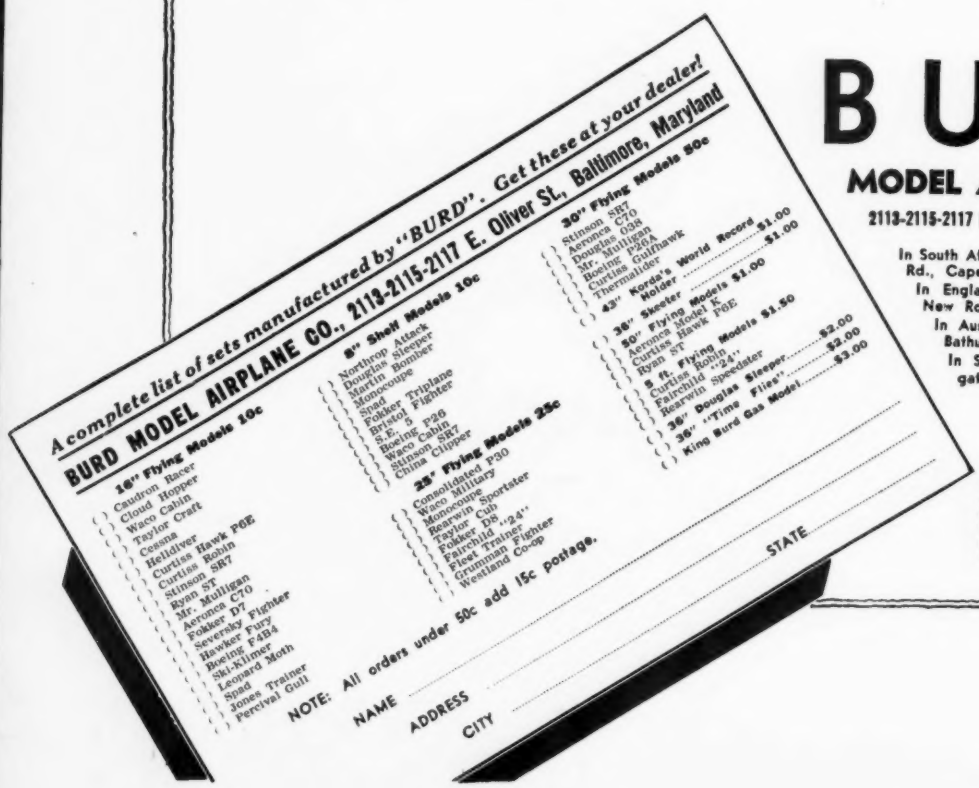
2113-2115-2117 E. Oliver Street, Baltimore, Md.

During our period of transfer shipments were irregular, correspondence was difficult, and all transactions were impaired. Your leniency and patience during these trying weeks has aided us considerably. All unfilled orders, all old correspondence, and any other miscellaneous details which have accrued will have our immediate attention.

Your esteem and patronage has made our growth possible. For this we thank you. For your constructive criticisms, your suggestions, your close co-operation, and your many kindnesses, we are grateful. Your constant good faith, your ready acceptance of our offerings, and your many thousands of letters of approval have filled us with pride. In short—we thank you one and all.

We humbly look forward to having you with us throughout the years.

The Management



BURD

MODEL AIRPLANE CO.

2113-2115-2117 E. Oliver St. Baltimore, Md.

In South Africa: Model Aircraft, Ltd., 23 Dock Rd., Capetown.

In England: Elite Model Planes, 14 Bury New Rd., Manchester.

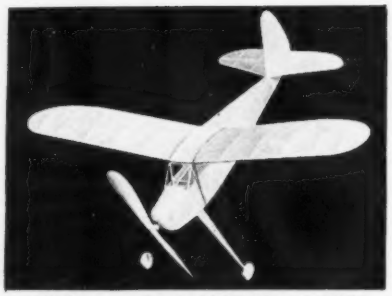
In Australia: K Dee Mnfg., Ltd., 113 b Bathurst, Sidney

In Sweden: Sven Wentzel, Apelbergsgaten 54, Stockholm.

DEALERS

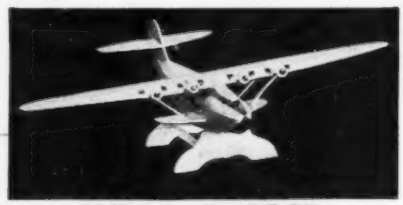
Avail yourselves of the ready profits made by progressive "BURD" dealers. Build yourself a model trade that will repeat consistently by carrying the "better" line of fine flying "BURD" models. Get our proposition.

MODELCRAFT Specials



30 in. PACIFIC ACE

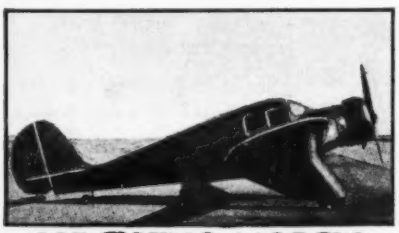
A practical and durable commercial model. Easily constructed from well drawn and detailed plans. **Kit contains** an ample supply of first grade wood and high quality cement. Comparable with and out-flies most dollar kits. **Add 10c for Postage.** **25c**



CHINA CLIPPER

10c SOLID MODELS

6" to 7½" Wing spans. Hawk, Spad, Fokker D7, Boeing P-26, Grumman Fighter, Caudron Renault, China Clipper, Mr. Mulligan, Waco C. Kinner Envoy, Northrop Gamma, Douglas Transport, Gee Bee, Goshawk, Boeing P12, Boeing F7-B1, Wedell Williams, Stinson Reliant. **Add 5c postage for each 3 kits.**



40" FLYING MODELS

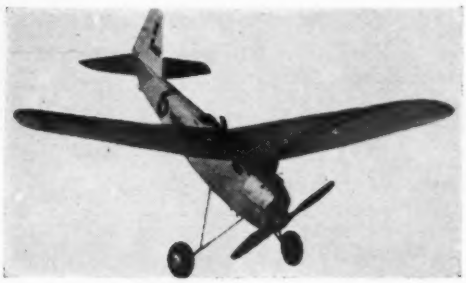
AERONCA Low wing (pictured) and REARWIN Speedster

Kit 50c plus 10c postage

1939 PACIFIC ACE GAS MODEL

New throughout, with latest improvements in design and construction. Flying weight 3 lbs., 4 oz. Wing span 66 in., tapered from 12 to 5½ in. **Kit contains** formed landing gear, formed aluminum (Orwick) cowl, die-cut ribs, inflatable air wheels, hook-up wire, cement, dope, complete..... **$8.50**

Dry kit same as above without cement, dope, silk or wheels **$4.75**



1938 SCOUT GAS MODEL

A Ship for POWERFUL flying, with a 60" tapered Clark Y wing. **Kit contains** formed landing gear, ready-cut ribs, formed face plate and cowl, switch, hook up wire, cement, dope, silk, full sized plans and Voit air wheels. Only..... **$7.25**

Prepaid in U.S.A.

Special money saving deal: Kit, Timer and Ohlsson engine..... **$25.00** **SAVE $2.25**

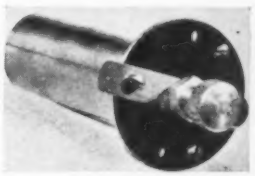
Same kit with bamboo paper and rubber Donut wheels **$4.85**

Dry Kit: No cement, dope, covering or wheels **$3.75**

THE FALCON

POWER WITH BRAT, TROJAN, HUSKY, ELF OR CHUNN ENGINE. Boys, here is the plane for you. Easy to build, and flies smooth as a Gull. 38" tapered wing. **Kit complete** with cement, dope, wheels, covering, printed ribs, formers, etc. **$1.50**

Deluxe kit with Traxler air wheels and silk covering **$2.95**

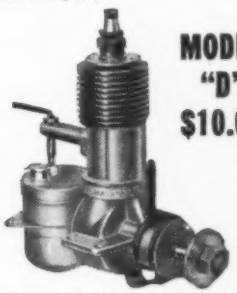


NEW FLIGHT TIMER

Adjustable from 1 second to 1 hour. Weight ⅝ oz. Accurate, reliable. Complete to drilled mounting holes. Ready to attach wires and install in ship. **The first dependable timer made just for models....** **$1.25**

BROWN JR. MOTOR

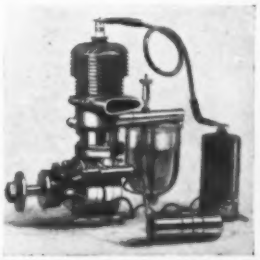
MODELCRAFT has been appointed Western Distributor for Brown Jr. Motors and will now carry a complete stock of motors and parts.



MODEL "D" $10.00

Complete ready to run with coil and condenser. The New Sensational Brown Jr. Model "D" at the low price of..... **$10.00**

Model "C"	$17.50
Model "B"	31.50
Model "M" (Marine)	15.00



1938 OHLSSON ENGINE

1/5 H.P. $18.50

A high-powered unit

SOGARD PROPELLERS

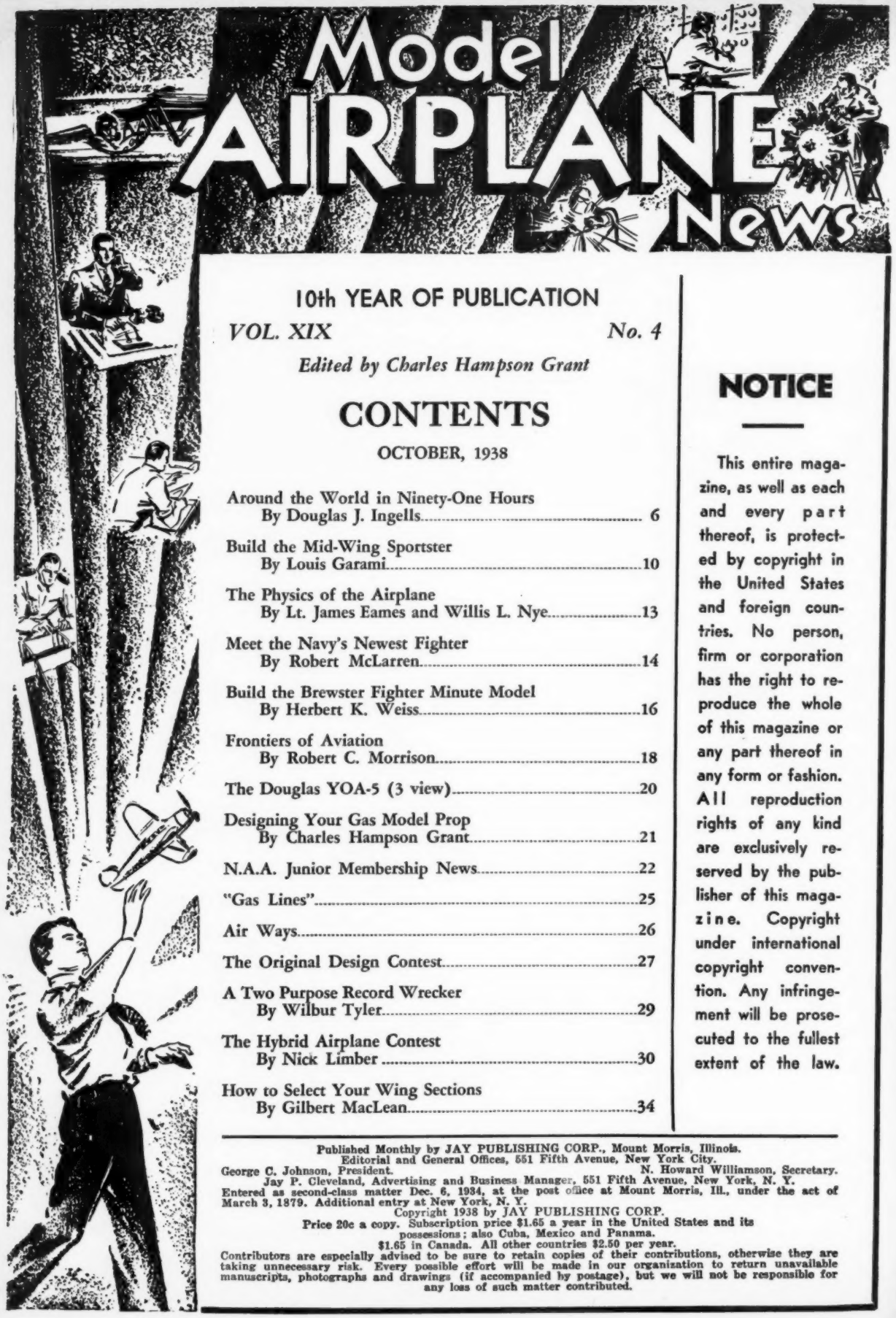
9", 12", 13", 13½", 14"

Same high-quality Sogard Propeller with true pitch, accurate balance, maximum thrust and minimum torque. **49c**

Take Advantage of This Sensational Offer. Order Today!

MODEL CRAFT LOS ANGELES, CALIF.

MODELCRAFT

7306 SOUTH VERMONT AVENUE, LOS ANGELES, CALIF. ★ THE LEADING SUPPLY HOUSE OF THE WEST ★

10th YEAR OF PUBLICATION

VOL. XIX *No. 4*

Edited by Charles Hampson Grant

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More and More Gas Model Enthusiasts are Turning to CLEVELAND—"THE GAS MODEL CENTER"

The C-D organization here in Cleveland, Ohio, is rapidly being acknowledged the gas model center for model builders from hundreds of miles around who come to us for their gas model needs as do the thousands of touring modelmakers who make it their point to stop to "see what we have" in the way of gas models and supplies. Of late we have been stocking extra heavily on gas model supplies and motors to meet the demand, in addition to the two already world-famous gas model designs shown here, the Rearwin and Stinson monoplane. The latter has been used by many experimenters for radio control work.

These two C-D gas models—real miniatures of big planes—loaded with every manner of easily made authentic detail—are such great values that it has been impossible for us to change the price of the kits which make up these two beauties. The Stinson Reliant, available in model GP-66 (dry kit), post-free $8.50. The GP-69 Rearwin Speedster (dry kit) post-free $4.85. In accordance with our gas model policy, the motor unit with propeller, wheels and wheel shoes are not supplied either, to give model builders their choice on these items. Extra parts to complete GP-66 (except power unit) $3.95. Kit of extra parts to complete the Rearwin $3.55 (except power unit). Add $.85 to either parts kit if you wish 3¼ M & M's instead of wood wheels or $2.10 for 3½" M & M's.

Whenever you are in need of gas models and supplies hereafter, don't fail to order from this ad, or send for our latest gas model list, issued periodically, to keep abreast of the time for new items. Send a $.03 stamp for your copy today or send a photo of your own gas model and receive it free regularly. If you wish our catalog of rubber driven flying models, railroad models and many items which often find their place in gas model work, readers of MODEL AIRPLANE NEWS may have it by sending an additional $.05. Remember the "gas" list contains many items the regular catalog does not.

FOR A REALISTIC GAS POWERED MODEL OF AN AIRPLANE

A BEAUT! REARWIN SPEEDSTER KIT GP-69 (DRY) $4.85

SPAN 64½"

C-D GAS MODEL SUPPLIES

Brown Jr. Model D Postfree	$10.00
Brown Jr. Model C Postfree	17.00
Brown Jr. Model B Postfree	21.50
Syncro Ace Motor, postfree	13.75
Syncro Bee Motor, postfree	12.50
Ohlsson Motor, postfree	18.50
Standard Airstream Dennymite Motor, postfree	15.85
Above Motor (S.A.Dennymite) less coil and condenser	13.85
De Luxe Airstream Dennymite, incl. Duraluminum Mount, Etc., postfree	17.85
All motors complete as usual, except S.A.D. as indicated.	
Cadet Starter, only	3.00
S.A.E. 70 Oil, 2 oz.	15c
½ pt.	.35
Br. Jr. Exhaust Manifold	1.00
Br. Jr. Spark Coil	3.50
Smith Coil	2.50
Lightweight Coil	1.45
1 Minute Timer (1 oz.)	1.95
AC Spark Plug ¾-24	.65
Condensers (finest make)	.15
Toggleswitch	.30
Knife Switch SPST	.25
Tip Jacks	.09
Tip Plugs Solderless	.09
Bamboo Tissue 24 x 36	.08
Wheel Shoes, Balsa (3¼ wheel)	.05
3¼ M & M Pneumatic Wheels	1.50
3½ & 4¼ M & M Wheels, pr.	2.75
3½ x 1¾ Balsa Wheels, pr.	.65
1/8x1/2x1/16 Alum Angle, ft.	.15
3/4x3/4x1/16 Alum Angle, ft.	.20

C.D. Utility Props—9"-10" 11"-12"-13"-14" each	.50
12" Laminated Props (special) varnished	.98
Varnished Gas Model Props 9-in. .75; 10-in. .75; 11-in. .85; 12 in. .90; 13-in. .95; 14 in.	.05
Grade "A" Silk sq. yd.	.50
Grade "AA" Silk, sq. yd.	.80
Striping Tape, 10 ft.	.10
Brass Collars with Set Screw, 1/8, 5/32, 3/16, 7/32 holes, each	.10
Cleveland's Super-quality Liquids: Balsa Cement, Paper Cement, Anti-Blush Thinner and all colors of Dopes, 1 oz.	.10
2 oz.	.18
½ pt. (8 oz.) .55; 1 pt. (16 oz.)	.95

—And many other parts, Cements and Dopes in bulk, 3 and 5 ft. wood, music wire, large sheets thin plywood, celluloid, etc., etc., parts—Pkg. and Shipng. charge 15c. Send 3c stamp for gas list alone, or 8c for both catalogs.

CLEVELAND'S NEW CLOUDSTER GAS KIT NOW READY

It's a knockout cabin monoplane for looks and performance. Resembles Rearwin above. (Photos next month.) Dry gas kit for the experienced, also easy for beginners—only $2.50 postfree without wheels, dopes or power unit. Including cement, dopes and M & M Gas Model wheels $4.25 postfree. 50" span, 31" length, for motors up to ¾" bore. Very simple to build, adjustable wing, stabilizer and rudder. Climbs and glides well. The $2.50 kit all balsa contains printed easy-cut ribs, etc., full size drawing, gas tissue, celluloid, shaped leading edge, all strip wood, music wire, nuts, bolts, washers, etc. Order at least your dry kit now to start and be sure to be among the first in your city to fly one—order the balance later—GP-5004 postfree only $2.50.

★ BIG PRICE REDUCTIONS ★

On C-D Rubber-Driven Models—As Much as 33⅓% off!

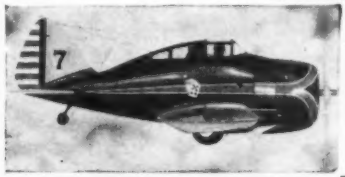
Here are a few of the big bargains now available in all C-D rubber driven model kits. We're making these sharp price cuts to stimulate business, put men back to work, help bring back prosperity. Buy now! Order the kits you want from your dealer, or direct from this ad.

HUGHES USED THIS EXCELLENT DESIGN (MODIFIED) ON HIS WORLD-CIRCLING FLIGHT

LOCKHEED ELECTRA
Span 27⅝". Dry Kit D-65 (no liquids), formerly $2.75, now $1.95

All Thompson Trophy Winners Dwarf size Dry Kits—each now only .50

Build the complete lineup of these 9 famous planes for only **$4.50** (Liquids extra)



THE FAMOUS SEVERSKY P35
Span 24". Dry Kit SF-61 (no liquids), formerly $2.65, now $2.25
Span 16". Dry Kit D-61 (no liquids), formerly $1.10, now $.85

Al Williams GRUMMAN GULFHAWK
Span 20". Dry Kit R-70 (no liquids), formerly $.85, now $.75

MARTIN BOMBER
Span 53⅛". Dry Kit SF-45 (no liquids), formerly $6.50, now $4.85
Span 35⅝". Dry Kit D-45 (no liquids), formerly $2.95, now $1.95

NEW C-D P26-A FIGHTER
Span 21". Dry Kit SF-60 (no liquids), formerly $2.65, now $2.25
Span 14". Dry Kit D-60 (no liquids), formerly $1.10, now $.85

PRICES REDUCED ON C-D RR KITS

Here are a few samples of the extra big values we're now offering: All Hopper Type cars now only .35; all 40-ft. box cars, now only .40; 50-ft. box cars only .45. Start this popular C-D gage now—you make big savings, and are building the best.

BIG SAVINGS ON

supplies, parts, tools—everything modelbuilders need. Readers of M.A.N. Rush 5c at once for C-D catalog of Kits and Supplies. (Otherwise it would cost 10c.) Add 3c stamps if you also wish Gas Model catalog.

VOUGHT CORSAIR V-65
Span 26¾". Dry Kit SF-41 (no liquids), formerly $2.95, now $2.25.

DOUG. O-38 OBSERV.
Span 30". Dry Kit SF-43 (no liquids), formerly $2.95, now $2.50.

AERONCA C-3 SPORT
Span 27". Dry Kit SF-40 (no liquids), formerly $1.95, now $1.25

CURTISS HAWK P6-E
Span 23¾". Dry Kit SF-21 (no liquids), formerly $2.50, now $2.25.

ORDERING INSTRUCTIONS: All direct orders subject to our regular shipping terms. Send check or M.O. (cash at own risk). No C.O.D.'s. To U.S. Possessions, Canada and British Isles, add 10% extra; all other countries, 20%, except those which have a "transit charge" then add 40%. Be sure to include 5c for our New Catalog, if you don't have a copy.

★ ★ **DEALERS:** Get in on the "big prosperity push"! C-D's new low prices put new pep and life into Kit sales. Act at once—wire or write for full details. ★ ★

CLEVELAND MODEL & SUPPLY COMPANY, INC.

4508-B70 Lorain Ave., *"Model Engineers Since 1919"* **Cleveland, Ohio, U.S.A.**

BABY CYCLONE breaks WORLD'S RECORD

Establishes OFFICIAL N.A.A. Sanctioned and Certified World's Endurance Record

Flies 2 HOURS, 1 MINUTE and 54 SECONDS--Breaks the Former Official World's Record by 40 MINUTES, 51 SECONDS

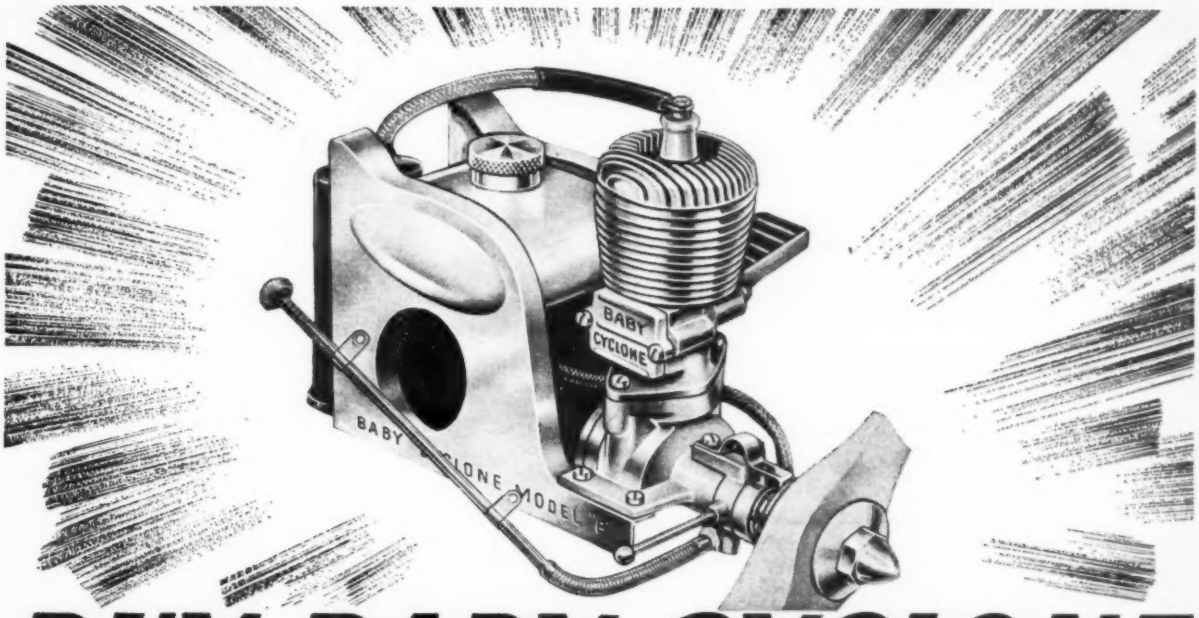
(William Enyart, Secretary of the N.A.A. officially advises us that the previous official world's record was 81 minutes and 3 seconds.)

In a flight officially sanctioned by the N.A.A., timed and certified by L. H. Therkelsen, official N.A.A. observer and timer, a BABY CYCLONE powered model built by Aircraft Industries and flown by Mel Anderson and Ira Hassad took off from the Long Beach, California, Airport on August 13th and flew to a new OFFICIAL WORLD'S RECORD OF 2 HOURS, 1 MINUTE and 54 SECONDS.

The establishment of this sensational new world's endurance record by Baby Cyclone again proves conclusively that Baby Cyclone is the world's outstanding engine. No other engine has ever approached Baby Cyclone's supreme performance.

★ Above, the record breaker makes a perfect take-off on its long flight. ★ At the right, Larry Therkelsen, official N. A. A. observer and timer, follows the flight of the Champion from the air. ★ Below, Larry Therkelsen congratulates Major C. C. Moseley, President of Aircraft Industries, on Baby Cyclone's sensational new world's record. Holding the model are Ira Hassad (left) and Mel Anderson, who built and flew the record breaker. At the right is Ralph Hall, pilot of the Stinson in which the observers followed the flight.

Buy the OFFICIAL World's Champion!



BUY BABY CYCLONE

The BEST *and* ONLY *engine we build!*

The full resources of Aircraft Industries have been concentrated on building ONE engine and building it RIGHT. The finest engineering and precision manufacture have produced an engine of tested power, balance and durability . . . the 1938 BABY CYCLONE Model "F". The sensational low temporary price of BABY CYCLONE is not the result of cheapening the materials or construction of a more expensive model. You make this great saving by buying direct from the factory, whose production methods and tremendous volume of sales permit us to offer you a high quality motor for the lowest price. Every engine block tested and given full throttle run. Fully guaranteed against defective materials or workmanship. The World's Greatest Value!

REGULAR PRICE $12.50
TEMPORARILY
Your Price
1938 BABY CYCLONE Model "F"

$9.00

Complete and assembled with coil, condenser, drawn steel engine mount, integral gas tank, remote control throttle, exhaust manifold and can of lubricating oil. Postage prepaid in the U.S.A. Price in all foreign countries $18 for the duration of this offer.

BUY DIRECT—
We Have No Dealers in the United States

"CYCLONE SERVICE" ⟶ Your engine positively will be shipped on same day your order is received

ORDER BLANK -- USE TODAY -- DON'T DELAY

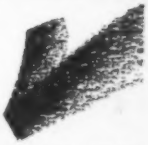
AIRCRAFT INDUSTRIES, GRAND CENTRAL AIR TERMINAL, GLENDALE (LOS ANGELES), CALIFORNIA

PLEASE SEND ME POSTPAID THE FOLLOWING ITEMS CHECKED. I ENCLOSE **POST OFFICE MONEY ORDER.**

◯ **BABY CYCLONE MODEL "F"** — Completely assembled as described above. REGULAR PRICE $12.50— **TEMPORARY PRICE** **$9.00**

◯ **BABY CYCLONE PROPELLER** — Specially designed to operate with Baby Cyclone at peak efficiency. Tested and balanced. It is advisable to have two or three of these propellers on hand. REGULAR PRICE $1.50— **TEMPORARY PRICE** **$1.00**

◯ ***Extra Special***
Combination BABY CYCLONE Model "F", Propeller and "Chief" Kit.
Regular Price $19.00
TEMPORARY PRICE **$12.50**



SHIP TO _____ Age ____ ADDRESS _____ N-10

BUY NOW -- BEFORE PRICE ADVANCES

Hughes' plane coming in after its first test-hop prior to its globe-circling flight.

Around the World in Ninety-One Hours

An Authentic Account of the Fastest Globe-Circling Flight in Aviation History, Giving Facts Gleaned from the Experiences of the Intrepid Men Who Made the Flight

By DOUGLAS J. INGELLS

IT WAS 6:20 E. S. T. Sunday afternoon, July 10th, 1938.

In the pilot's compartment of the *1939 World's Fair* plane Howard Hughes and Ed Lund sat side by side ready to lift the ship into the air. Hughes still had his felt hat resting on his head and his white shirt was open at the neck. But he was ever the pilot; alert, steady, anxious to get the ship off the ground and get this flight underway.

He jockeyed with the two throttles, those little knobs which look like the top of a gear shift on an automobile. He was testing the motors to see that they were in good order before putting them to the tremendous task which lay ahead. Each smoothly purred out its song of power. The ship trembled a little as every plane does just before it starts down the runway for its take-off.

Then the plane started to roll. For forty-five seconds the heavily laden ship bounced along the runway. It hit one bump which was harder than the rest. She left the ground for a brief second, settled back again, then once and for all lifted herself away from "mother earth" and pointed her nose into the eastern sky.

She was off!

There were five men in the plane; Howard Hughes, the pilot, whose desire to forward the progress of aviation had led him to back the flight. Ed Lund, who was alternate engineer and mechanic. Richard Stoddard, the radio engineer; Harry Connor and Lieut. Thurlow of Wright Field whose duties were to keep the ship on its proper course through their knowledge of aerial navigation.

They were off on a great adventure which was to carry them around the world in less time than was ever dreamed of. To them however, it didn't seem like that at all. They thought of it as nothing especially unusual. This was a flight which just had to be successful because it meant building a new and stronger faith in the profession which they all loved.

The words which Howard Hughes himself used when he spoke to the crowd before the take-off can best explain how strong this feeling truly was:

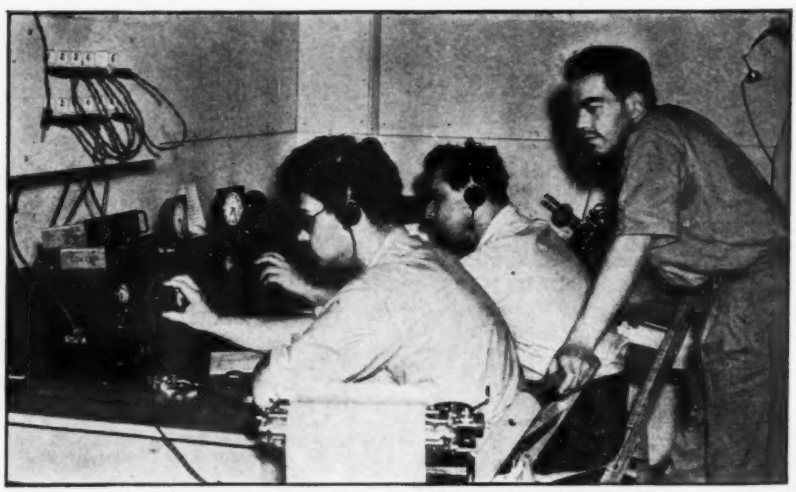
"I hope," Hughes said, "that in some measure this flight will bring about a world fellowship among aviators. No matter whether you are Hindu or American, as I am; if you fly, we speak the same language."

That faith was something which these five intrepid fliers had to uphold. They didn't have time to think of glamor, adventure or thrills. They had work to do and plenty of it!

Paris in Sixteen Hours

Once in the air the plane circled slowly over the crowd at a low altitude, banked, and headed toward the northeast and its goal—Paris, 3600 miles away. It didn't take long for it to leave the field far behind and within a short time it was over Long Island and heading north along the Atlantic coast.

The plan was to fly the "great circle" route across the Atlantic: The same trail Lindbergh had blazed on his flight to Paris eleven years ago. Although it may seem contrary to the geometric axiom that a straight line is the shortest



The radio crew at New York, which kept contact with the plane.

An actual picture of Hughes' plane just as it rolled to a stop at the airport in Moscow, Russia.

distance between two points, this "curved line" route by way of Nova Scotia, Newfoundland, Ireland and finally Paris, is actually the shortest distance to Europe, since it allows for the curvature of the earth's surface. It also eliminates a great deal of over-water flying.

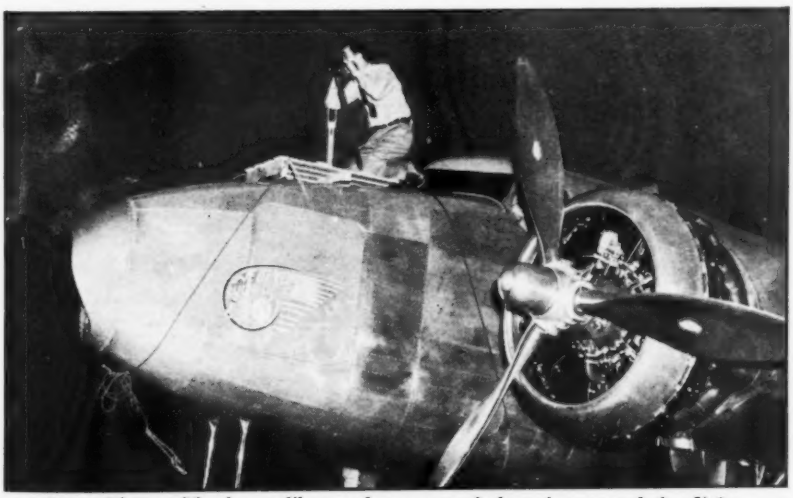
A few hours out from New York the heavy load of gasoline which the ship carried necessitated "reving up" the motors, which in turn diminished the supply of gas far more rapidly than had been expected. It looked as if the gas supply might give out before the ship reached Paris. To add to the troubles it began to rain a little. Hughes and Lund started to complain that the windshield was leaking and that they were getting wet. Despite the fact, however, the ship was riding the rain squall so comfortably and smoothly one couldn't have felt more at home even in an armchair.

The fliers hit Nova Scotia and Newfoundland right on the nose, and from there on out across the Atlantic, picked up a tailwind which proved favorable and increased the speed sufficiently to make up for the loss in fuel supply. At times they averaged between 225 and 250 miles per hour and flew at altitudes ranging from three thousand to fifteen thousand feet. Most of the flight across the water, however, was made at the higher altitudes. This eliminated much of the rough air encountered at the lower levels due to the atmospheric reactions of air and water.

In the future, scheduled operations across the Atlantic will undoubtedly be carried on with planes which are capable of utilizing the "upper level" flight area. The Hughes plane proved it was safer and smoother to ride the upper air across the Atlantic. With planes such as the DC-4 and the Boeing "strato-liners" about to come into operation, the dangers of ocean flying should be greatly eliminated. Already aviation experts are willing to acclaim that landplanes are more efficient than seaplanes. With this in mind one may soon expect to see the mighty airliners flying regular schedules across the Atlantic. Hughes proved it could be done.

The Hughes plane ran into little difficulty on the remainder of the over water flight to Paris. Most of the flying was done at night and there was nothing to see but darkness and the Atlantic. Perhaps, as they winged their way across the sea these five daring aviators reminisced a bit and there came to mind thoughts of others who had flown above this same body of blue in the years gone by. There were Lindbergh, Chamberlain and Levine, Byrd and others who had successfully conquered the Atlantic by air. Then there were those who had failed and lost their lives in the attempt. They were the true trail blazers of the skyway across the Atlantic. Hughes, Lund, Stoddard, Connor, Thurlow were a group of fliers who wanted to prove to the rest of the world that the modern transport plane and the present day navigation instruments were capable of making the hop without too much difficulty.

"1939 World's Fair" was a twin-engined Lockheed 14 transport plane especially built for Howard Hughes. She looked like any other Lockheed transport plane, but the interior was radically changed from the standard ship. There had to be extra fuel tanks and these took up a great deal of cabin space. The ship was divided into three compartments: The pilot's compartment, the radio opera-



Lieut. Thomas Thurlow calibrates the compass before the start of the flight.

Hughes at Moscow, looking through the cables he has just received.

Hughes surveys the damaged tail-wheel bulkhead after the landing at LeBourget Field, France. It was ingeniously repaired.

tor's compartment and the navigator's compartment. They were each separated from the other by the large gas tanks installed in the fuselage and the partitions. Communication was carried on over an inter-phone system which allowed each crew member to be in constant contact with the others at all times. The pilot's compartment was standard size, while the navigators' and radio operator's compartments were small spaces about five feet square. It was necessary for two men to work in the former, Thurlow and Connor. They had to keep maps, instruments and other equipment in this small space and it was a tough job to keep everything in order and readiness for the various operations necessary in navigating the ship. They were riding the airlanes and the surface craft which plowed through the waves below them could worry about the Atlantic and her turbulency. All they had to do was keep on the right course and within a short time they would be across the ocean in Paris. That was the advantage of this new way to cross the Atlantic.

But this job of keeping on the correct course was a mighty tough one. It was no easy task to navigate a plane which sped through the air at two hundred miles per hour, across the Atlantic, at night. It required all the knowledge of navigation which one could muster together. This was the job which faced Lieut. Thurlow and Harry Connor.

It is interesting to know how one plots his course when making a flight such as the one Hughes completed, but it is difficult to explain without going into technicalities which the layman cannot comprehend. However, to get it down to a simplified basis; if you took a piece of string and stretched it around the circumference of the globe, in this particular case, from New York to Paris, you would complete the first step in the problem of navigation. That is, you would have a "curved line" which cuts the course across the Atlantic.

At various intervals along this line you mark "checking" points, imaginary landmarks, so that you can check your position as the plane speeds on its way across the ocean. These points have definite longitudes and latitudes, and by mathematical computations the navigator can determine just what these are. In this way he can plot his course on a chart and connect the points with straight lines; a procedure which is more commonly known as "charting a course."

But this is only part of the job. After the course is marked on the chart it is necessary to check the position of the plane at different intervals to see that it is not varying off that course. Thus comes into being the term, "shooting the stars." There is one infallible axiom upon which the navigator can rely—the heavenly bodies never lie. He uses the sextant to determine his position on the globe. With this instrument he "lines up" two heavenly bodies, any two will do, and obtains two imaginary, intersecting lines. The point of intersection is the location of his position on the earth's surface.

Thus, by making "shootings" at different times on the flight, the navigator can check and determine his exact position on his chart. If the ship appears to be off its course, he directs the pilot to change his direction to the left or right, which ever his figures indicate, and then he continues to take "shootings" until the plane is once again back on its proper course. It was necessary to make numerous observations on the flight across the Atlantic. The plane flew high and the stars were clearly visible. Consequently aside from the actual work dealing with mathematical computations and the numerous observations necessary, the task of navigation did not present a serious problem.

Lindbergh hit Ireland only twenty miles from the spot he had intended to strike it. The Hughes plane did just about the same. That short distance didn't make much difference. The main thing was seeing Ireland. To those in the plane it must have looked greener than any green had ever looked before. For eight hours they had seen nothing but darkness and water. Now, they knew they had licked the Atlantic. The most treacherous part of their first lap was behind them.

They sped rapidly over the Irish towns, thence on out across the English Channel to France and Paris. At LeBourget Field there was a large crowd waiting for their arrival. It was second only to the one which had gathered to cheer Lindbergh when he had landed there after his lone flight across the Atlantic. Only a few hundred yards from the plane as it came in for a landing was something which was typically American and it made the fliers feel right at home; like landing at Chicago, or Dayton, or some other American city. It was a British Airlines plane of the same make as the Hughes ship—a Lockheed 14 transport from the Burbank Factory in California —preparing to make its landing. She was only a short distance away and Hughes circled before making his landing in order to let the transport plane land first. Then for the first time since it had left Floyd Bennett Airport, the nose of Hughes' plane pointed downward.

The wheels settled easily to earth.

This was Paris!

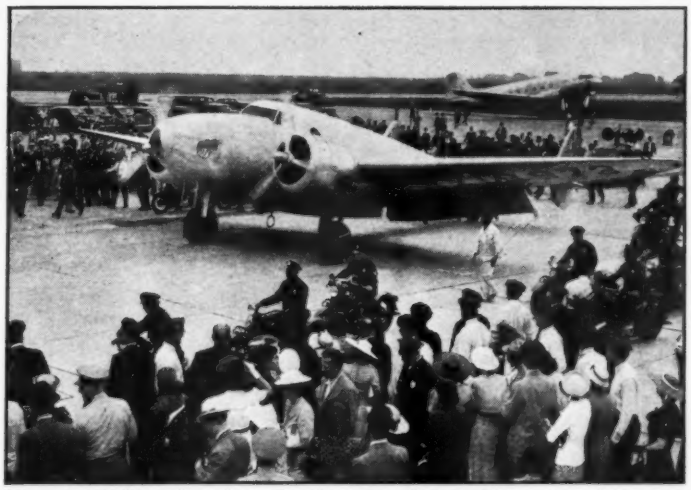
It was 10:58 Monday morning.

The flight to Paris had taken 16 hours and 38 minutes!

Next Stop, Moscow

When the plane landed at LeBourget Field in Paris the United States ambassador, William C. Bullit; his daughter, Anne, and several other embassy attaches were there to greet the fliers. They were escorted through the crowd which had

Mrs. Thurlow greets her husband as he steps from the door of Hughes' plane at the completion of the flight. A delirious crowd waits to greet the dauntless fliers.



Howard Hughes' plane just after his triumphal landing at Floyd Bennett Airport, New York; 3 days, 19 hours, 17 minutes after his start.

New York welcomes Hughes as he rides up Broadway after his record flight.

gathered about the plane, and finally reached the hangar, where they could talk to the ambassador and make plans for a quick take-off on the next leg of their journey.

The ambassador congratulated the whole crew on the flight and offered every assistance possible in refueling and checking the ship. After an inspection of the plane it was learned that the bulkhead to which the tail wheel is fastened had been strained in the take-off from Floyd Bennett airport in New York. That one bump, which had sent the plane into the air a little, evidently had done the damage. French mechanics took one look at the damage and threw their hands into the air shouting, "C'est fini." It is finished!

Ed Lund the flight engineer broke out with, "Fini, hell, we ain't even started yet," and looked the situation over to see what could be done about it. It had to be admitted that things didn't look so hot. From all indications it would take sometime to make the necessary repairs, and waiting meant losing precious hours.

The damage which had been with the plane since it left New York had caused no deficiency in the plane's flying qualities. It consisted of a badly bent bulkhead and might have withstood further flying, but to be on the safe side, Hughes decided to wait for the repairs.

The problem was solved when the ambassador offered the services of his own private mechanic, Sergeant Cook, who attends to the ambassador's private plane. Cook was a former U. S. Army Sergeant, and the way he started in on those French mechanics, in their own language, gave the Americans enough faith in him to believe that if this bulkhead could be repaired, Cook was the man to do it.

Cook and Lund worked together and got everything they wanted in the way of materials and assistance. They tried to fix the break with two-by-fours, but that didn't work so well. Then they tried some angle irons and these proved just the thing. Before long both promised there would be no more trouble from the weak bulkhead.

After it was finished and the ship had been properly gassed and made ready for the take-off for Moscow, the next stop, Hughes made the remark that he hoped to see Cook again and reward him for his services, since without question this jovial sergeant had saved many a precious hour. Nor did he have any idea of a reward when he bade farewell to the fliers. He said in parting, "It would be a mighty fine thing if an aviator couldn't help out a fellow flier when he needed it. You would have done the same for me if the tables had been turned."

This meant a lot to Hughes, since he had started this flight with the hope of bringing about a better understanding among the aviators of the world. Here was proof the plan was succeeding.

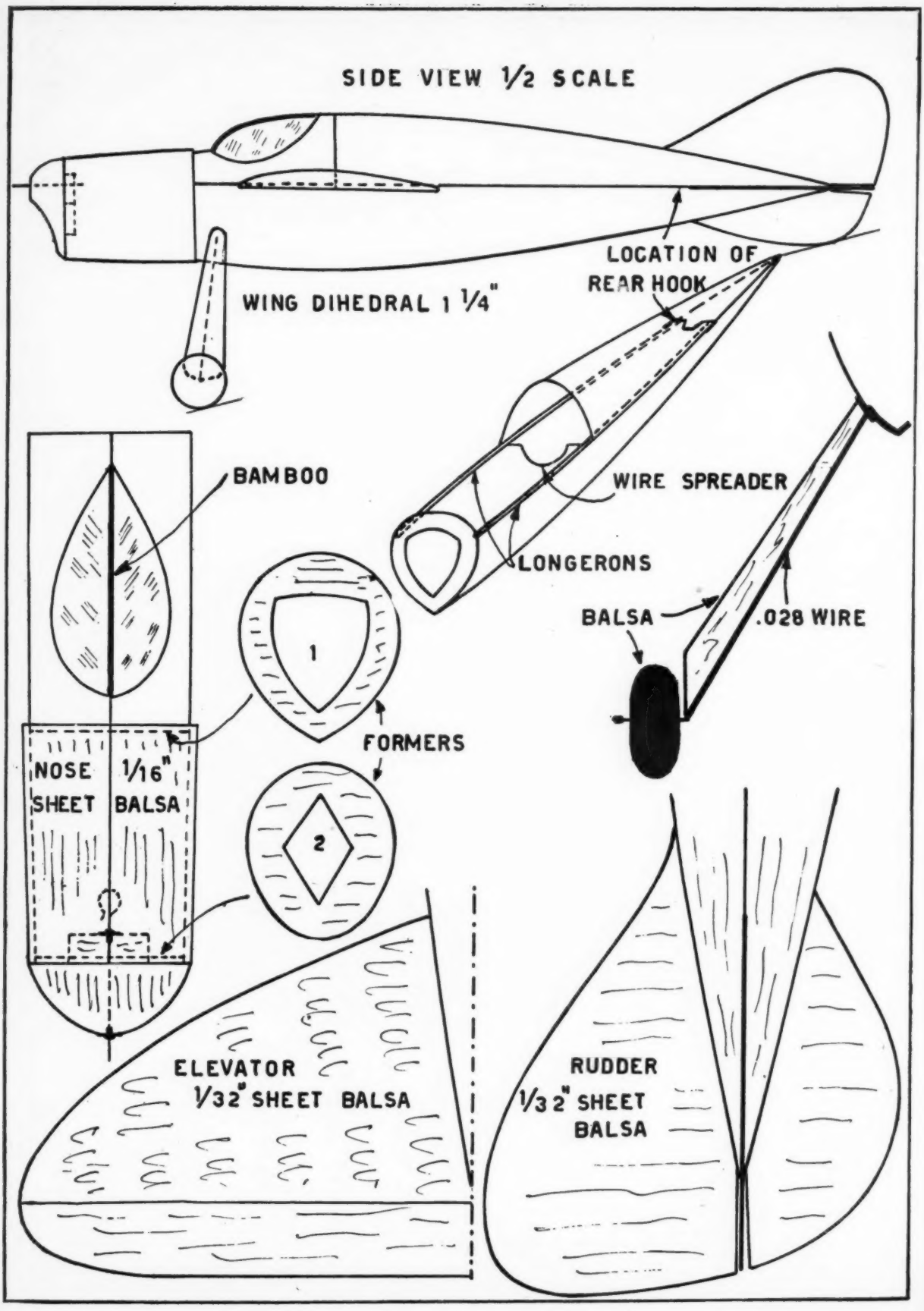
It was 7:24 when Hughes headed the ship into the wind and gave her the gun for the take-off. She roared along the runway gaining speed, but for some reason hesitated to leave the ground. The left wheel bounced several times. The runway wasn't very long. At the end was a small fence and beyond that a house and a factory chimney. The plane was heading for the space between the two. The wheels took one final bounce, cleared the fence by inches, and the plane soared into the sky; the house a little below and the chimney just to the right. Hughes didn't attempt to circle. He held the ship into the wind until it had gained a good altitude and then headed straight for Moscow.

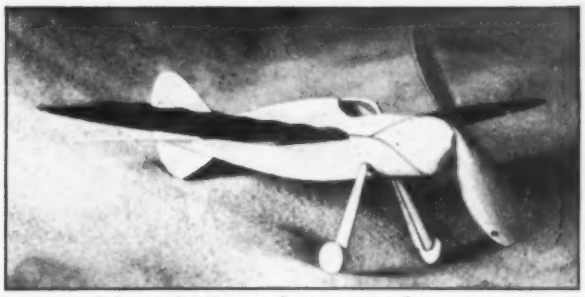
A member of the embassy staff at Paris had mapped out a course for the fliers from Paris across Belgium to Germany passing over Berlin and Cassel, thence over Poland to East Prussia, Lithuania, Latvia and finally to Soviet Russia and Moscow. This was the course which they planned to follow.

The rain which had been just a drizzle

(Continued on page 52)

The five daring men who accomplished the historic flight. L. to R.: Lieut. Thomas Thurlow, co-pilot; Eddie Lund, flight engineer; Howard Hughes; Richard Stoddart, radio engineer; and Harry Connor, navigator.


SIDE VIEW 1/2 SCALE
LOCATION OF REAR HOOK
WING DIHEDRAL 1 1/4"
BAMBOO
WIRE SPREADER
LONGERONS
BALSA
.028 WIRE
1
FORMERS
NOSE SHEET
1/16" BALSA
2
ELEVATOR 1/32" SHEET BALSA
RUDDER 1/32" SHEET BALSA



The sheet balsa fuselage of monocoque design produces rounded graceful lines and great strength

Build the Mid-Wing Sportster

A Fine Consistent Flier of Sleek and Refined Monocoque Design That Is Very Easy to Build and Fly

By LOUIS GARAMI

ALTHOUGH a large percentage of modern ships is constructed of sheet material (either sheet metal or plywood), in the model building game this type of construction has been very much neglected.

When it comes to models, the prototype of sheet metal is naturally sheet balsa, so to correct the above mentioned deficiency here is one "coming right at you."

The ship described here is a sample of what can be made out of sheet balsa, and provided the builder is willing to assimilate the knowledge passed to him by this article, it will net him an excellent ship and a study in balsa wood as well.

The weight of this monocoque body is no more than that of a built-up type of the same size, but it is stronger and more practical in every respect. The test ship had several sets of rubber broken in her without any damage to the fuselage; and after dozens of indoor and outdoor flights she is still ready to meet all comers.

Here are some facts about the ship:

Wing area: Fifty square inches.

Total weight: Seven ounces.

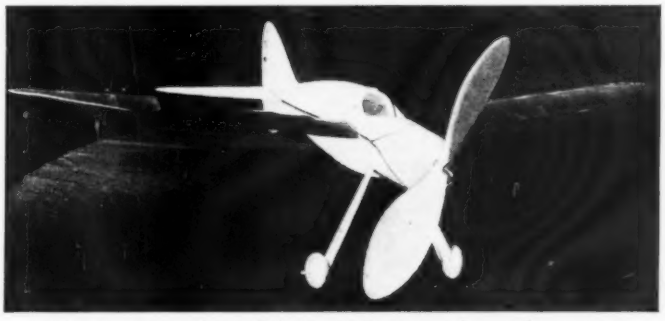
Power: Four strands of 1/8" rubber.

Maximum winds: 700.

Endurance indoors: 45-55 seconds.

Endurance outdoors: 60 seconds—fly away.

As the method of body construction is entirely new, to carefully read over that section of the instruction is absolutely necessary before attempting to wield a razor blade.



The large propeller and light weight insures fine performance. A low center of lateral area provides stability.

Body

Much of the ease with which the body can be made depends on the sheet of 1/32" soft balsa secured for this purpose. The most important features of this piece should be a straight grain and an even hardness (or rather softness) all the way through. First copy and cut out blanks No. 1, making sure that the grain is running in the same direction on both pieces. Holding the two together, sandpaper them alike and make pencil marks 3/4" apart starting from the front. Do not forget that these marks will be inside body, so a left- and a right-hand piece is required. Now make the cement marks with a stick, just like it is shown on the plan, and lay them aside to dry.

In the meantime, cut the two longerons out of hard 1/16" sheet balsa. Make sure that they are exactly alike because the shape of the body depends on them. By this time the two blanks should be pretty well curled up. The depth of the curvature should be more than 1/4".

In case the cement marks are perfectly dry (after about one hour) but still the sides are not cupped enough, additional cement marks between the old ones will remedy the matter. This method is used also in equalizing the curvature of the two sides. To compare them just put one into the other and look at them from the front.

Now pin the two pieces together, starting at the pointed ends, at about forty-five degrees angle. This operation is the easiest when done in sectons. For instance, the first five inches are pinned and glued at the seam; when the glue sets, two more inches are done, and so on. Try to increase the angle a little toward the front, if it is possible without much forcing. Here are a few words to explain:

When the three spreaders; namely the rear hook, the middle wire spreader and the front former No. 1, are about to be put into the body, it is better to have the body sides opened up slightly more than the required width because by drawing them together a little the curvature of the sides will not be affected. While, if they have to be forced apart the sides will flatten out somewhat and might also twist.

The next move is to cement and pin in the two longerons. Their place is up at the open edges of the boat-like creation and should correct any deformation that may have developed so far. Adding the three above mentioned spreaders will finish the bottom of the body.

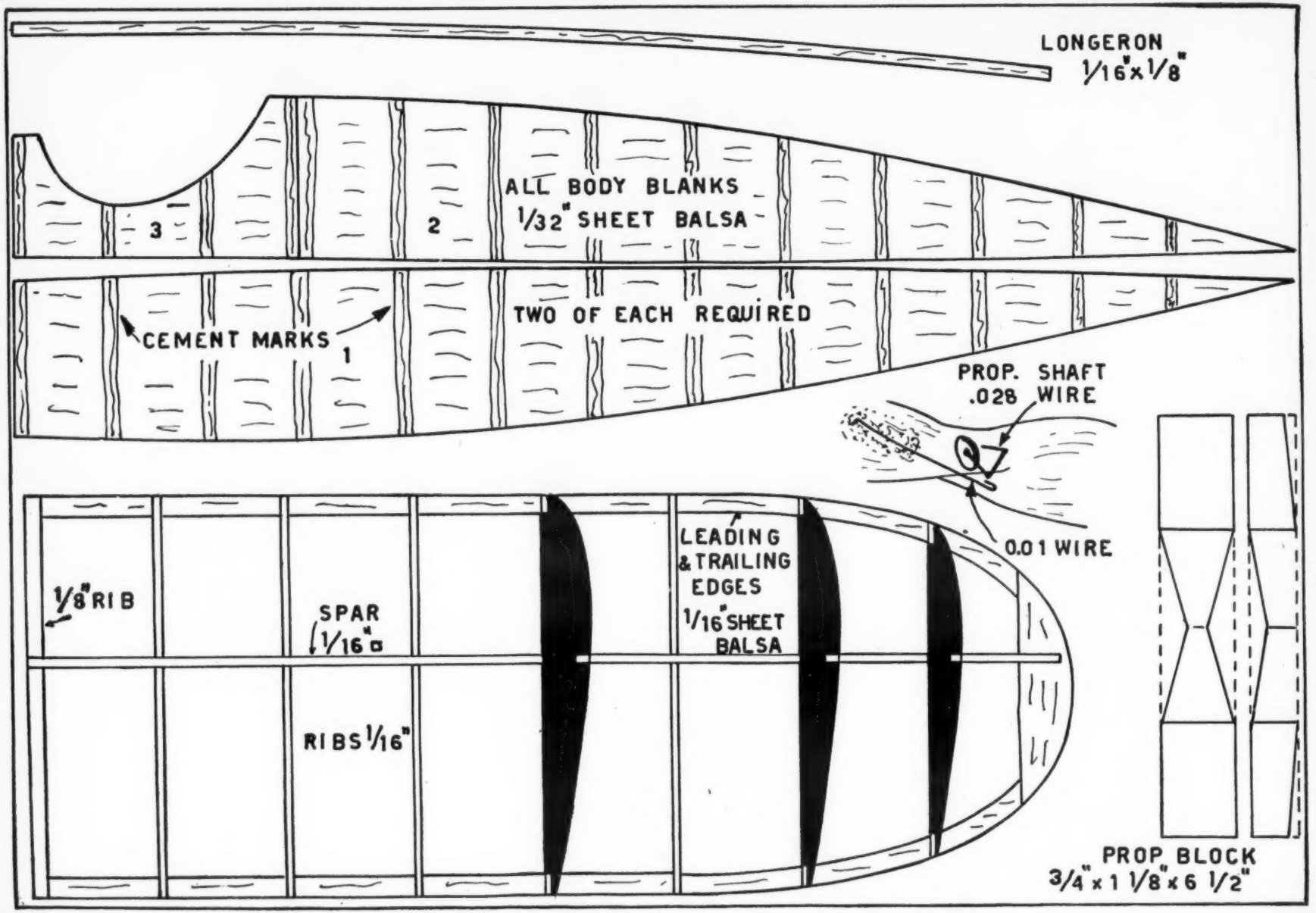
Now the two No. 2 blanks are treated the same way as No. 1 was. After the curvature is made they are pinned and cemented together at an angle which will assure a fair fit to the already finished bottom. When the cement is dry, use this procedure for joining:

Pin and glue the pointed ends together first. Wait until the glue has set and then proceed to draw one side together little by little. Holding the body in one hand and putting cement in the seam with the other is the best way to get speedy results. Pins are positively not wanted at this operation because of the big holes left when removed. Repeat the procedure on the other side. Use cement sparingly on the side joints, to be able to sandpaper them smoothly later on.

The preparation of No. 3 blanks is the same as the others. These are fitted to the body separately and joined behind the cabin and on the former last.

The nose of the body is bent out of two pieces of 1/16" sheet balsa. Inasmuch as there is no blank given in the plan for

(Continued on page 51)


LONGERON
1/16" x 1/8"
3
2
ALL BODY BLANKS
1/32" SHEET BALSA
CEMENT MARKS
1
TWO OF EACH REQUIRED
PROP. SHAFT
.028 WIRE
0.01 WIRE
1/8" RIB
SPAR
1/16" □
LEADING
& TRAILING
EDGES
1/16" SHEET
BALSA
RIBS 1/16"
PROP BLOCK
3/4" x 1 1/8" x 6 1/2"

The Physics of the Airplane

Article No. 3

The Third Article of a Series Explaining the Laws Which Govern the Flight and Structure of an Airplane

LT. JAMES and WILLIS L. NYE

The Laws of Motion and the Airplane

IN COMPARING the evolution of aircraft, some persons still wonder how it is possible to fly ten-ton transport airplanes when but a few years ago an airplane which exceeded 1200 pounds was considered to be "large." This query can be answered by telling them that the flight of aircraft is fundamentally an application of force. Therefore our wholesome strides in aviation are principally based upon the greater exploitation of force as applied to modern aircraft.

The layman automatically assumes that the flight of an airplane involves a certain expenditure of force. The amount of force is more or less in approximate relation to the general size of the airplane. It is also apparent that considerable force must be expended to slow down an airplane when it is rolling along the ground immediately after a three-point landing. The higher the landing speed, the greater the force required of the brakes to bring the machine to a complete state of rest. These phenomena are visual and are apparent to the casual visitor to the airport.

There exists the three laws of motion which have been theorized by Sir Isaac Newton. These laws apply to the flight operations of all aircraft. For the sake of convenience these will be repeated here:

(1.) Every body continues in a state of rest or uniform motion in a straight line, unless it is compelled to change that state by an application of some external force.

(2.) The net or effective force acting on a body is proportional jointly to the mass and acceleration produced by this force.

(3.) To every force or action there is always an equal and opposite reaction.

If you study these laws carefully, you will see that the word airplane could be substituted for the word "body" in every one of these fundamental laws. These laws are also applicable to the science of airplane stress analysis because these encompass the science of mechanics.

The gravitational units of force are the pound or the kilogram. A pound can be defined as the magnitude of a force equivalent to the pull of gravitation of the earth acting on a mass of one pound. "Mass" is defined as the amount of matter which is encompassed by the linear dimensions of a body. The weight is a means of determining the force of attraction for the amount of material which the object contains. By this means, some rational yardstick is established as a method of determining the mass of physical bodies.

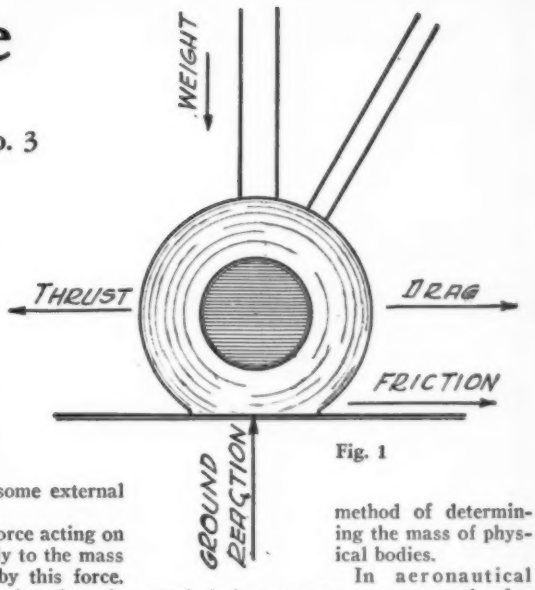


Fig. 1

In aeronautical work it is not customary to speak of a mass of an airplane. We do, however, use the term mass of air in certain wind tunnel investigations, such as, the mass of air acted upon by the wing is a direct function of the induced drag. Or, we also use the term mass in speaking of certain external balances which are attached to the movable surfaces of the wings or tail to react against or dampen out flutter. Thus the term mass has a definite value in aeronautics.

Inertia is the property of a body to keep moving under an application of force or to remain at rest if no forces are acting upon it. For instance, if the airplane is flying along in level flight and it encounters an updraft, it resists displacement in the vertical plane by an equal amount to the external force. Thus the personnel is

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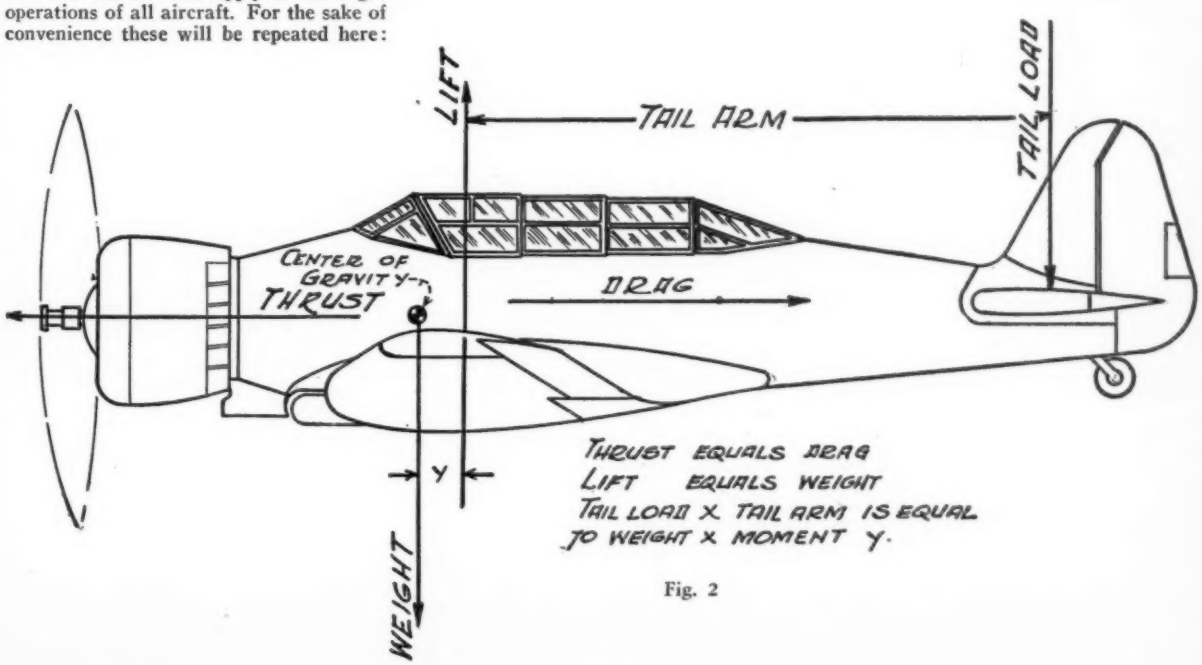
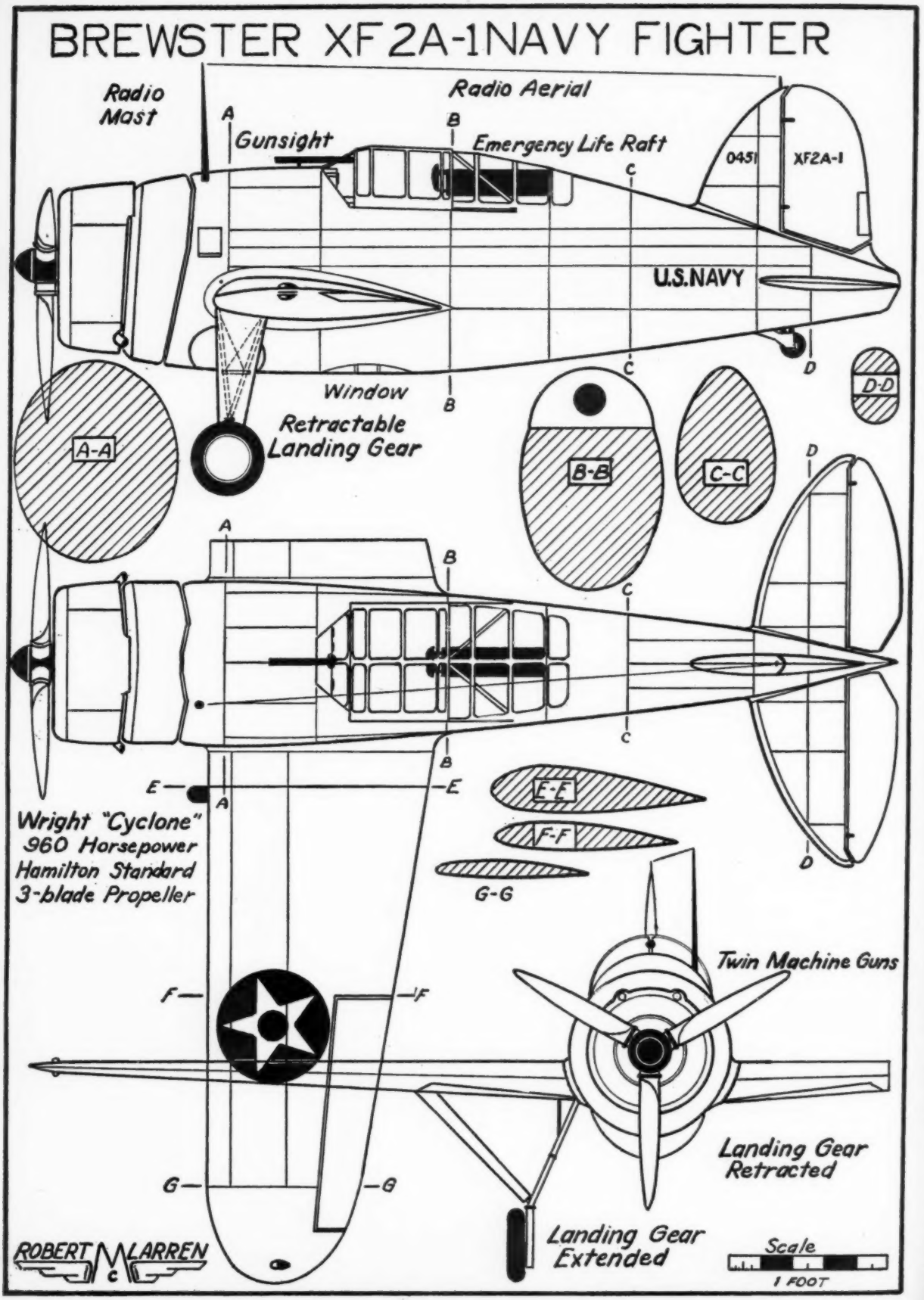
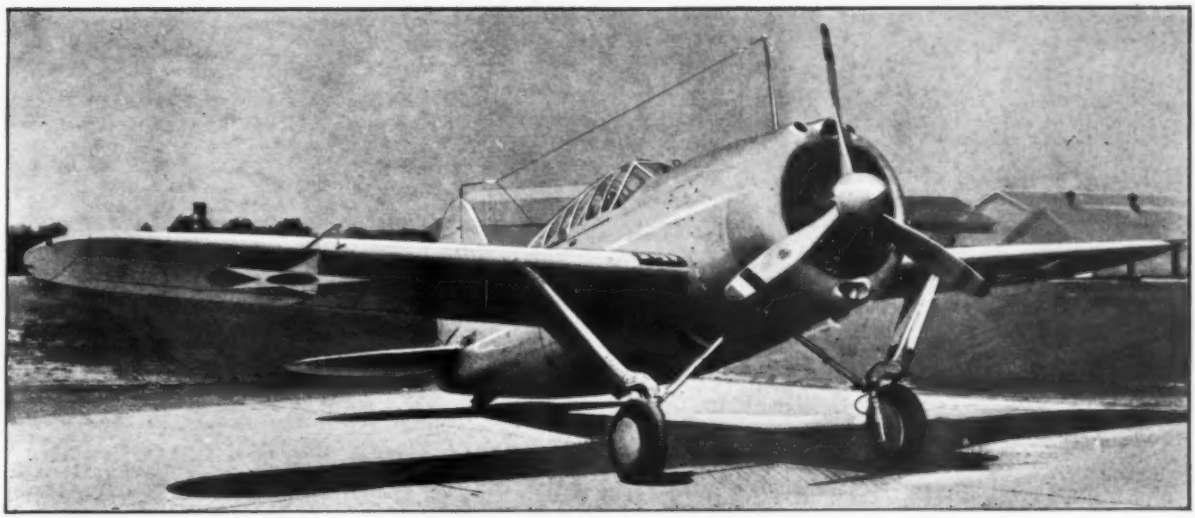


Fig. 2


BREWSTER XF2A-1 NAVY FIGHTER
Radio Mast
Radio Aerial
Gunsight
Emergency Life Raft
0451
XF2A-1
U.S.NAVY
Window
Retractable Landing Gear
A-A
B-B
C-C
D-D
E-E
F-F
G-G
Wright "Cyclone" 960 Horsepower Hamilton Standard 3-blade Propeller
Twin Machine Guns
Landing Gear Retracted
Landing Gear Extended
Scale
1 FOOT
ROBERT McLARREN



The latest deadly addition to Uncle Sam's Navy fighting force, the Brewester XF2A-1

Meet the Navy's Newest Fighter

The Story of the Plane on the Cover—The Brewster XF2A-1 —and How You Can Build a Solid Scale Model of It

By ROBERT McLARREN

THE United States Navy's recent call for fighting plane bids has been answered by four of the nation's aircraft manufacturers. One of these is a newcomer in the group but, strangely enough, seems to be leading the field. This is the Brewster Aeronautical Corporation of Long Island City, New York; designers of the ship pictured in the striking cover photo this month: the Brewster XF2A-1.

Long a builder of America's finest carriage and automobile bodies, the Brewster organization has manufactured aeronautical parts and supplies for more than six years. Their initial invasion of the airplane construction field was the XSBA-1, a two-seater scout-bomber, designed for the navy late in 1936. This craft featured a cantilever mid-wing design with a novel type retractable landing gear in which the wheels fold into the fuselage and the supporting struts become part of the leading edge of the wing. Considerable re-designing has been done on the original version but the craft has, as yet, met with but little success.

And now the XSBA-1's little brother has made its initial appearance in answer to the Navy's single-seater fighting plane competition. Basic design work on the XF2A-1 as well as the other fighting planes listed in the contest, was done by naval aeronautical engineers stationed at the navy's experimental testing base at Naval Air Station Anacostia, Washington, D.C. This ship constitutes a mid-wing, all-metal monoplane with cantilever tail and wing surfaces, monocoupe fuselage construction and the situation of the pilot amidship. Retractable landing gear, wing, fuselage and tail unit detail design were left to the manufacturers.

Brewster's solution to these problems has met with outstanding success and the XF2A-1 is now stationed at Anacostia undergoing the strenuous experimental acceptance tests.

The craft is powered with a Wright "Cyclone" nine-cylinder, air-cooled, radial engine, type SGR-1820-G103, developing 960 horsepower at 8700 feet, making more than 1,000 horsepower available for take-off. Ease of accessability has been stressed in the design of the engine mounting and the removable cowling and cleverly situated landing gear facilitates this feature. The airscrew is the Hamilton Standard three-bladed controllable type with complete de-icer slinger ring installation.

Forward all-metal cowl has been designed for streamlining this huge radial engine into the narrow fuselage with a minimum of resistance. Cooling grooves encircle the fuselage just aft of the power plant. Wings are of all-metal design being built up of duraluminum spars and ribs and 24ST Alclad sheet covering. Ailerons are all-metal, fabric-covered and are aerodynamically balanced necessitating no external appliances. Landing speed deceleration has been accomplished with the aid of split trailing edge type flaps.

The landing gear is hinged at the juncture of the wing and fuselage and at an outer point in the leading edge of the wing, constituting a strong, triangular structure. Retraction is accomplished by the folding in of the main strut towards the fuselage, bringing the wheels up and into a position located well in and under the fuselage. The structure is then sealed by the outer strut fairing which closes into the leading edge of the wing. Operation is hydraulic and can be accomplished in nine seconds.

The pilot is located high in the center of the fuselage, great pains having been taken to insure his unobstructed vision of

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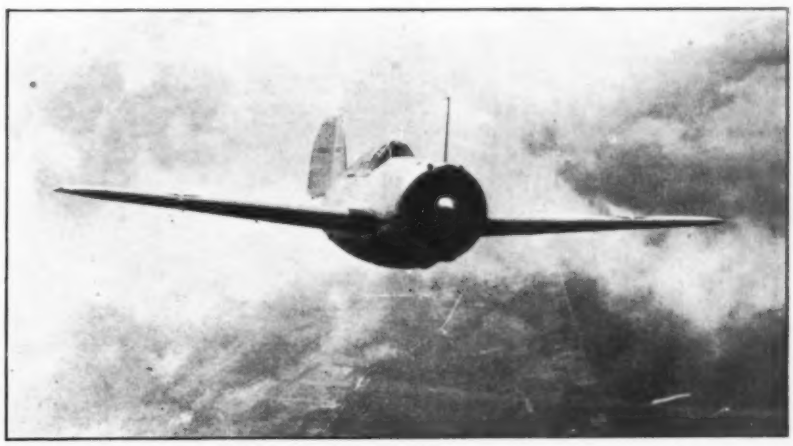
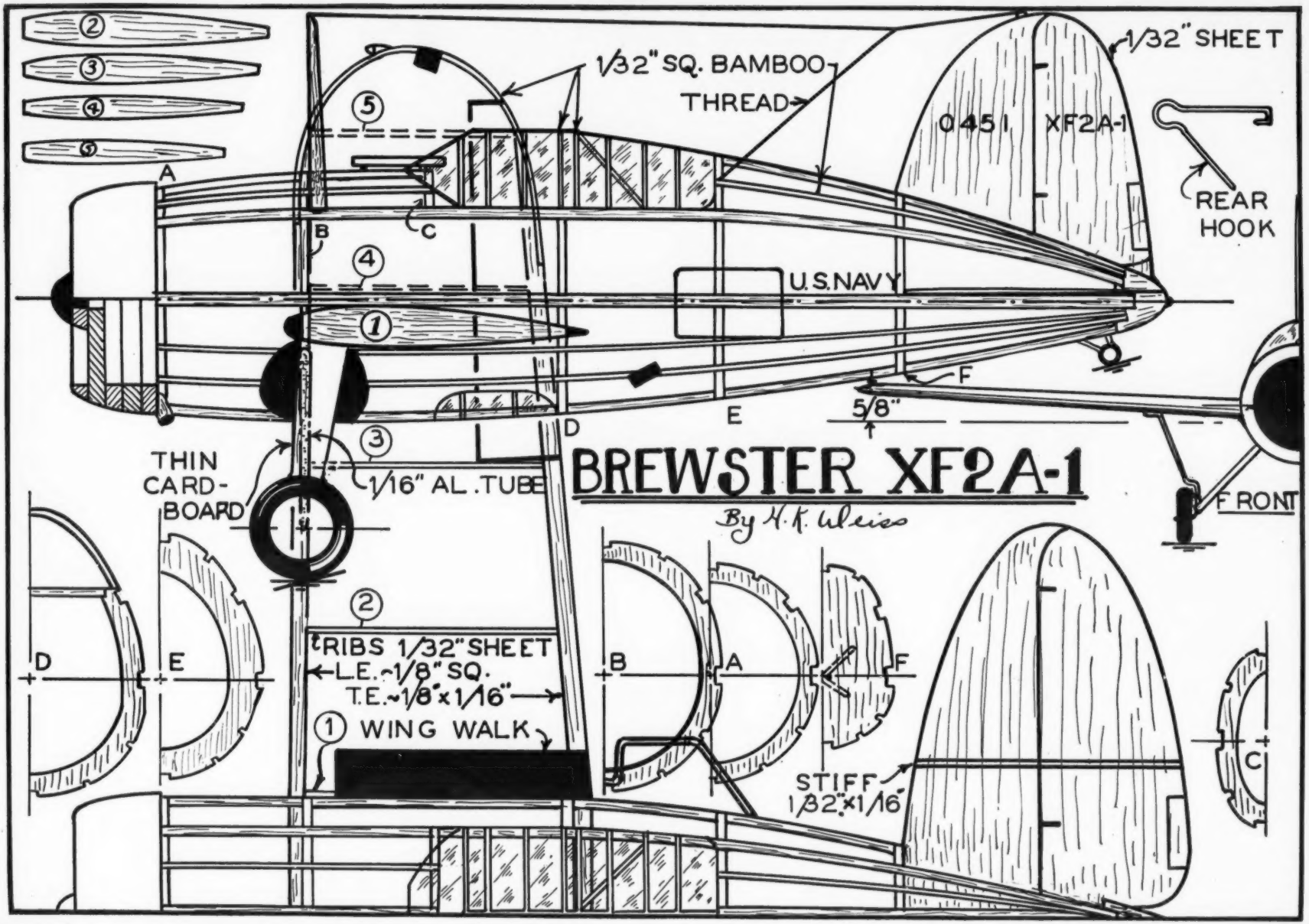
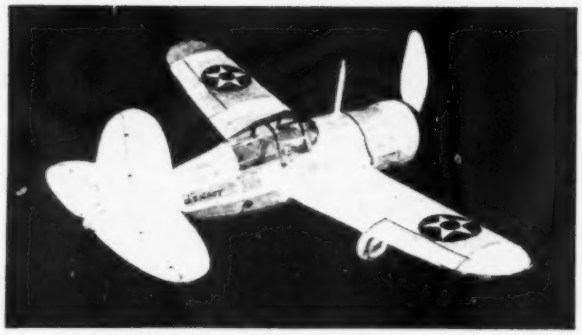
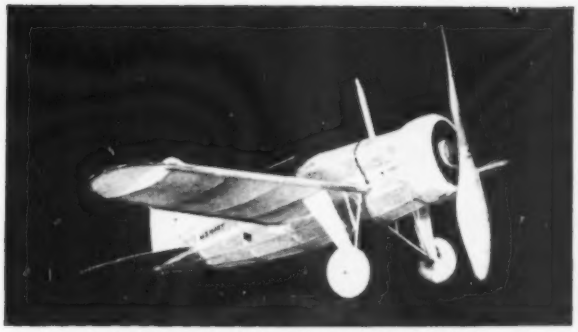


Rocketing skyward nearly vertically. The ground may be seen below


1/32" SQ. BAMBOO
THREAD
1/32" SHEET
0451
XF2A-1
REAR
HOOK
U.S.NAVY
5/8"
FRONT
THIN
CARD-
BOARD
1/16" AL. TUBE
BREWSTER XF2A-1
By H.K. Weiss
RIBS 1/32" SHEET
L.E.-1/8" SQ.
T.E.-1/8"x1/16"
WING WALK
STIFF
1/32"x1/16"



Simple to build, yet very realistic

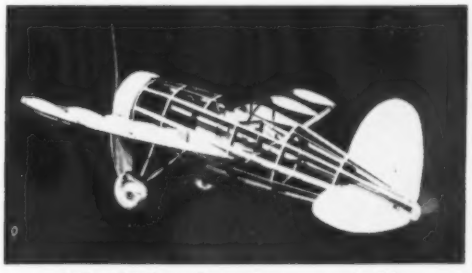


A large prop and clean lines insure fine flights

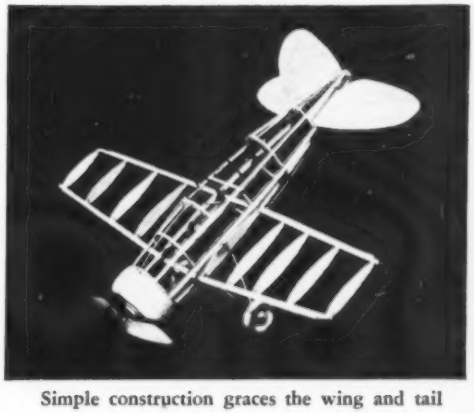
Build the Brewster Fighter Minute Model

A Real Flying Replica of the Navy's Latest Fighter, the Brewster XF2A-1, That Is Easily and Quickly Built at Small Cost

By HERBERT K. WEISS



The fuselage frame is easy to build



Simple construction graces the wing and tail

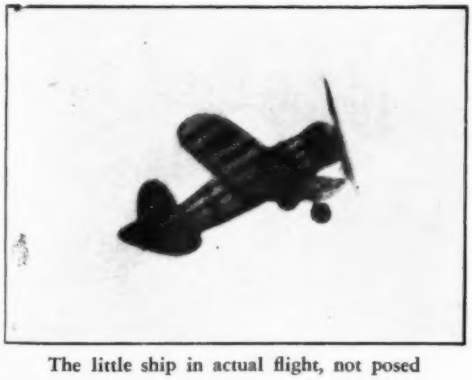
SLEEKEST of the navy's new fighters is the Brewster XF2A-1, a thick bodied, mid-wing fighter of the Gee Bee school of design. Recent tests so pleased naval officials that fifty-four of the little ships have been ordered at a total cost of $1,910,395.

Your fleet of models would not be complete without a flying replica of this remarkable stubby battler. Here's how you can build one in a very short time. If you have not build many flying scale models before, this is a very good one with which to begin.

The model has been somewhat simplified in the interests of flying ability, but still retains all of the characteristic features of the real ship.

Wing

Begin the construction with the wing, which is made in one piece. Cut out two of each size ribs from 1/32" sheet balsa, and assemble the wing over the plan. To make the left half, simply pin a piece of blank paper at the lower margin of the plan and draw in the left panel with the aid of a ruler, so that you will have a layout for the whole wing. Cut the leading and trailing edges to shape after the cement has dried and add the bamboo wing tips. Crack the spars just outside rib 1 and then recement them to give the wing the correct amount of dihedral.



The little ship in actual flight, not posed

Fuselage

Cut out two halves of each fuselage bulkhead from 1/16" sheet balsa and cement the halves together. Cement bulkheads B and C to the wing center section as shown on the plan. Add the two main 1/16" x 1/8" side stringers, and cement bulkheads A, E and F to these. Top and bottom stringer of 1/16" square balsa are now put in place, and finally the thin 1/32" square bamboo stringers which absorb the stresses of head-on impacts.

Now bend the cockpit frames from 1/32" square bamboo. The plan shows the correct number, but for such a small flying model the builder will probably prefer to simplify the arrangement as shown in the pictures of the test model.

Cowl

The cowl may be made in a number of ways. The method shown on the plan of assembling it from circular rings cut from 1/8" sheet balsa is probably the simplest. Hollow out the inside further after the rings have been cemented together, and sand the outside smooth.

Tail Surfaces

Trace the outline of the tail surfaces on 1/32" sheet balsa and cut them out with a sharp razor. Sand smooth on both sides, and add the stiffeners to the stabilizer. Cement the stabilizer in the proper position on the fuselage. Add the rear hook at this time. The prong projects through the side of the fuselage so that it is not necessary to poke around inside the fuselage trying to find the hook when installing a new rubber motor.

Covering

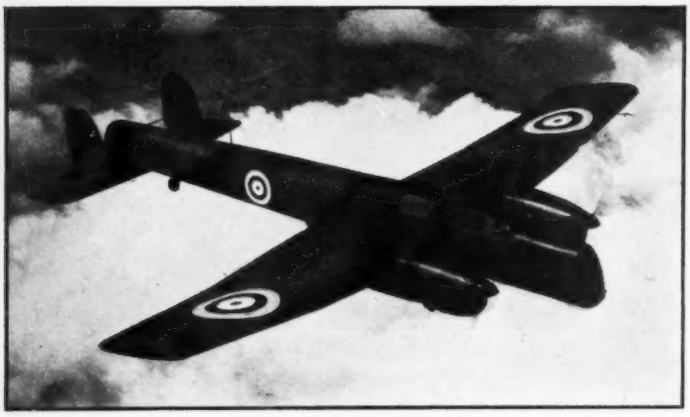
Cover the model using small pieces of tissue for the sharply curved portions of the fuselage. It is a good idea to cover one longitudinal segment between two stringers at a time. White tissue can be used for lightness, or the proper colors

(Continued on page 38)

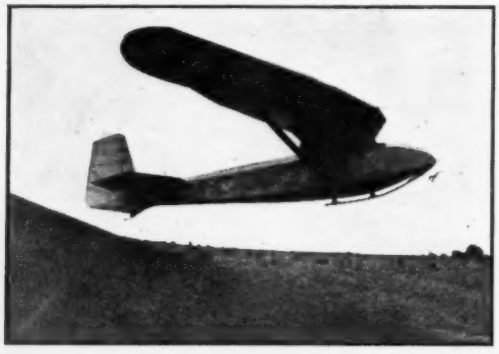
Frontiers of Aviation

Latest Developments in Giant Commercial Transports and Flying Boats for Ocean Service — Highlights of Contenders in the National Air Races

By ROBERT C. MORRISON



The "Whilley IV" long range heavy bomber, with 1050 hp. Rolls-Royce "Merlin" engines. (Monkmeyer)



The glider in which Capt. Balfour established a duration record with a pilot and passenger, flying over Dunstable Downs, England. (Acme)

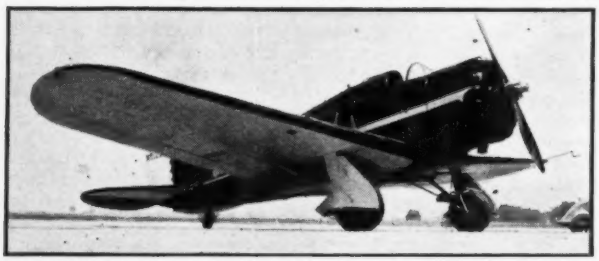
A transport equipped with a feathering propeller. Note the motionless propeller on the left. (Soibelman)

HERE we go again on that big airplane business. Details of the bids sent in to Pan American Airways on the big transatlantic ships have filtered through from various sources, and a summation conveys some very interesting facts. Very surprising it was to see the bidders have such varied ideas on what the desired airplane should be like. American aviation in the past few years has been more or less conservative in the design of new airplanes, taking careful progressive steps and profiting as much as possible from the predecessor models. However Pan Am's request called for a large step forward, and it was pleasing to see that the American designer had not fallen into a "rut," but still had imagination and the courage of his own ideas. The designs submitted certainly brought this out. Pan Am's call for bids was offered in very brief but concise fashion, and the designer, in order to win that order for about a dozen ships, has to be a very clever one with a few tricks up his sleeve. Being of such large proportions it was not likely that the plane designed along conventional lines would get the orders.

We thought the purchase of the planes would be announced by the time this is written but that is not the case, so since our conjectures a few months ago are already proving true we will go further and see if we cannot pick the winner of this competition. Now we will tell you all we know about the five entrants and then tell you why we think a certain design will be the lucky one. Perhaps as you are reading this the outcome of our choice may reveal itself. But here is a description of the five planes as we have seen them . . . . . .

Taking Douglas's entry first, we see that it is the only landplane in the competition which is already old news, but something that has been overlooked is that it is the only airplane powered by radial engines! . . . . . that is as far as we have been able to glean from various sources which appear authentic. The Douglas is a six-engined semi-low wing airplane with a fuselage, a

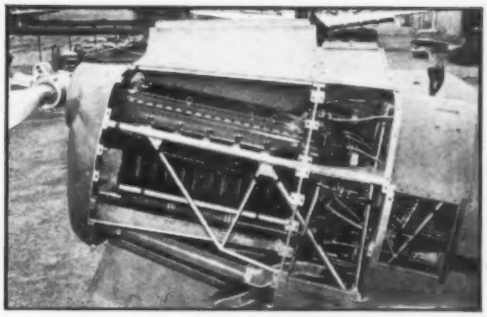
The experimental Vought XOS24-1 with new flaps. (Thorell)



Paul Mantz' new Lockheed Bendix Racer. (Morrison)

The Fokker PJ-1 metal patrol boat. (Brinsley)

The new Lockheed Altair with two side by side Menascos geared to one propeller. (Morrison)



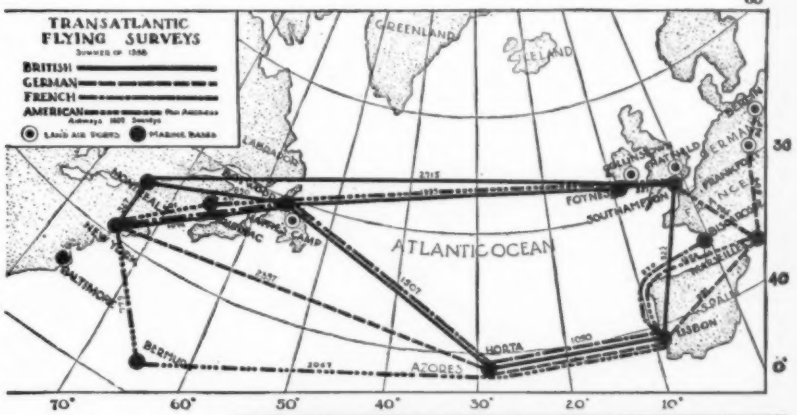
The engines in the nose of the "Altair". (Acme)

circular cross-section and a very palatial interior for the hundred passengers. The lines of the plane are very sleek and of the five entrants it is most likely the fastest. Whether Douglas wins or not, this airplane may none the less become a reality because it is something our domestic airlines need. But before this huge craft is built we will see the evolution of the DC-5 which is a development of the DC-3 in many respects. The DC-5 is now taking form for its first test hop.

The Seversky creation has already been extensively dealt with in these columns, so we will go on to the third entrant, that of Boeing with their six-engined slender hulled flyingboat. This airplane most closely fits the conventional trend with the wing set almost amid-ships and with the bow projecting well forward like the new French boats. It is a very clean cut airplane with two decks for the passengers. To insure stability, the singular rudder as shown on the prospectus may become plural before the plane ever reaches the flying stage. The new Navy Consolidated boat that was completed some time ago has now taken on a double-rudder tail and so will Boeing's 314 that was flown just recently. The six powerful engines drive tractor propellers and are imbedded in the wing.

Closely following Boeing's creation is the Sikorsky six-engined airliner with a double rudder tail and a well streamlined hull. Both planes have retractable wing floats but there seems to be no evidence of retractable hull steps, such as the French are now experimenting with. The Sikorsky has the usual straight center wing section with extreme taper to the outer panels. The Douglas, Boeing, Seversky and Sikorsky are well up in the 200 foot wingspread category while the fifth entrant, the Consolidated flyingboat, has a spread of only 194 feet with just four engines producing the power . . . . . and this is the ship that we predict will win the order. It will be the cheapest to build, the most economical to fly, and there is little doubt that it will fulfill all of Pan Ameri-

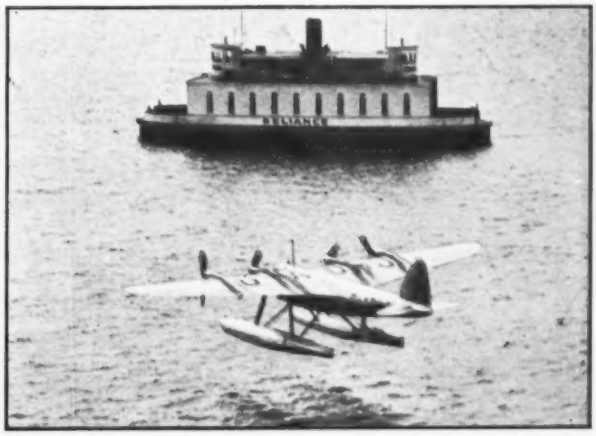
(Continued on page 44)



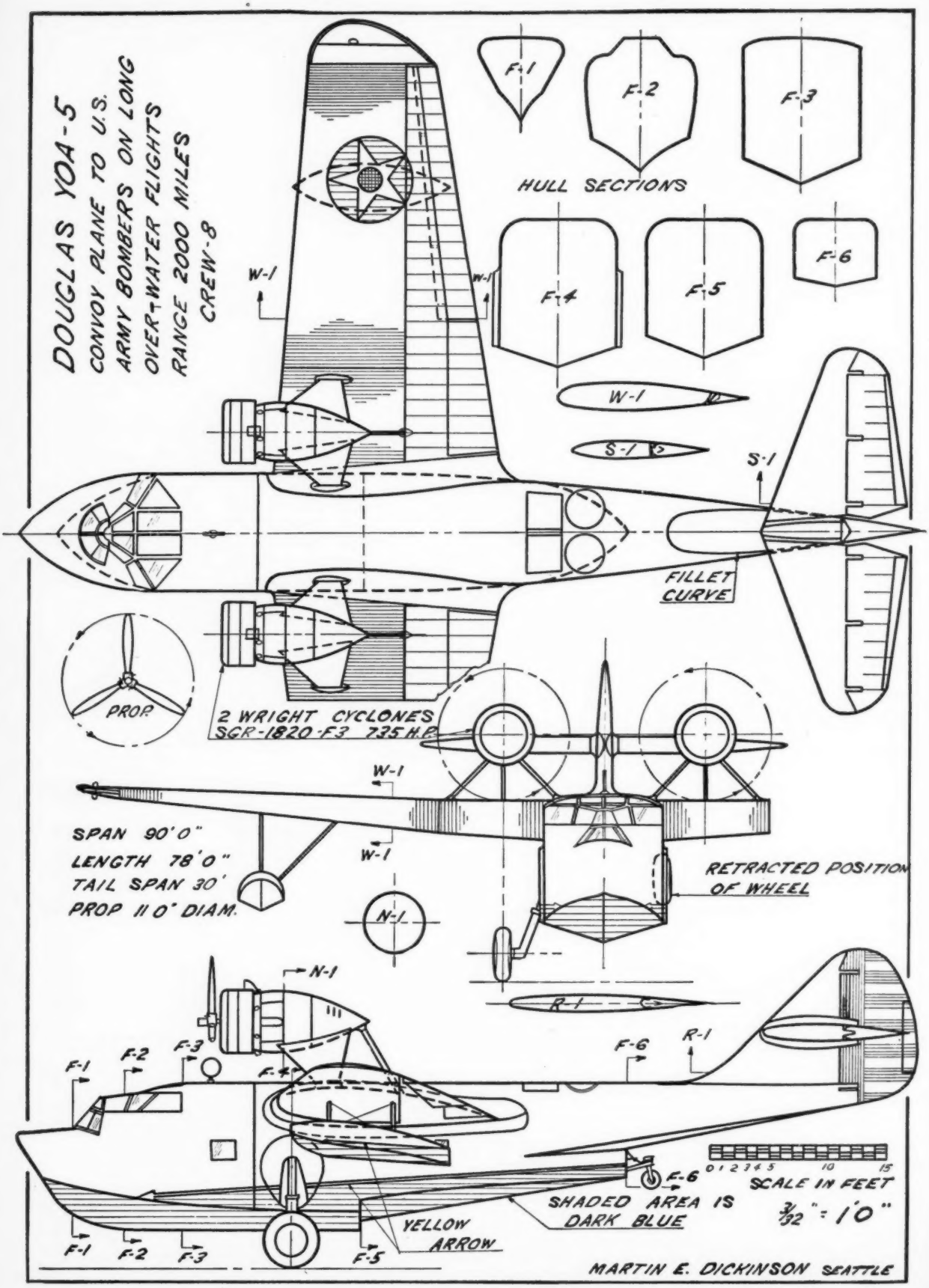
Map showing routes of Atlantic survey flights to be made this summer. (Acme)

The nation's largest air transport, Douglas DC-4, 42 passenger giant. It weighs 65,000 pounds. (Acme)

The pick-a-back plane at Port Washington, L.I. (Acme)



The pick-a-back plane landing after its ocean hop. (Acme)


DOUGLAS YOA-5
CONVOY PLANE TO U.S. ARMY BOMBERS ON LONG OVER-WATER FLIGHTS
RANGE 2000 MILES
CREW-8
F-1
F-2
F-3
HULL SECTIONS
F-4
F-5
F-6
W-1
S-1
FILLET CURVE
PROP
2 WRIGHT CYCLONES SGR-1820-F3 735 H.P.
SPAN 90'0"
LENGTH 78'0"
TAIL SPAN 30'
PROP 11'0" DIAM.
N-1
RETRACTED POSITION OF WHEEL
R-1
0 1 2 3 4 5 10 15
SCALE IN FEET
SHADED AREA IS DARK BLUE
3/32" = 1'0"
YELLOW ARROW
MARTIN E. DICKINSON SEATTLE

Designing Your Gas Model Prop.

Article No. 78

How to Determine Your Plane's Flying Speed and the Correct Pitch of the Propeller Which is to Drive It.

By CHARLES HAMPSON GRANT

Chapter No. 5

EVEN though the proper combination of diameter, blade width and pitch of a propeller that will absorb any given amount of power, may have been determined, the problem of design has not been completely solved. This is merely the first step. In previous articles of this series it has been shown how to establish or select combinations of values of these three propeller characteristics that will absorb the power delivered by the engine and cause it to turn at approximately 4000 revolutions per minute. If a propeller is used that does not possess the proper combination of values of the diameter, blade width and pitch, for any case, the engine may turn faster or more slowly than 4000 R. P. M. Most engines develop their maximum power when turning over at this speed under the load of driving a propeller. It has been selected for this reason. How to determine the characteristics of a propeller that is driven at other velocities will be explained in the course of this discussion.

The angular attitude of the blades of a propeller determines its pitch, because it determines how far the propeller will screw itself forward through the air in one revolution. A propeller with a pitch of twelve inches will move forward twelve inches if there is no slip to the blades. Thus if the propeller turns at 4000 revolutions per minute such a propeller will move forward (4000) x (12 inches) or 4000 feet in one minute. This is called the pitch speed of the propeller. Now it becomes obvious that all propellers of a given pitch and turning at 4000 R.P.M. have the same pitch speed.

In order to vary the pitch speed, or the speed with which it screws itself forward through the air therefore, it is necessary to vary the propeller pitch accordingly. If a pitch speed of only 3000 feet per minute (34.1 miles per hour) is desired for a propeller, the pitch would have to be nine inches at 4000 R.P.M. Thus it may be seen that the pitch speed is determined by the pitch at any given number of engine R.P.M.

However every propeller, when revolving, must *slip* a certain amount in order to generate thrust; that important backward force which drives forward the airplane, on which the propeller is mounted. Usually the amount of *slip* changes in any case in which the propeller may move forward with the plane at varying speeds. However at a given angle of incidence of the wing, the plane will have a definite *minimum* flying speed in horizontal flight. Thus at this speed the propeller will have a definite amount of slip. This amount of slip should be such that the propeller will deliver its maximum thrust when climbing. From many practical experiments it has been determined that the propeller should slip an amount equal to 33 1/3% of its theoretical pitch at the minimum flying speed in order to obtain maximum climbing efficiency from the plane. Thus if the propeller has a theoretical pitch of twelve inches and it slips 33% of twelve inches when the plane is flying at its minimum flying speed, then the propeller is advancing through the air actually only eight inches per engine revolution, or 2663 feet per minute. This is the condition of maximum efficiency. Therefore the minimum flying speed of any plane on which such a propeller is mounted should be 2663 feet per minute, or $\frac{2663 \times 60}{5280} = 30.3$ miles per hour.

(Continued on page 48)

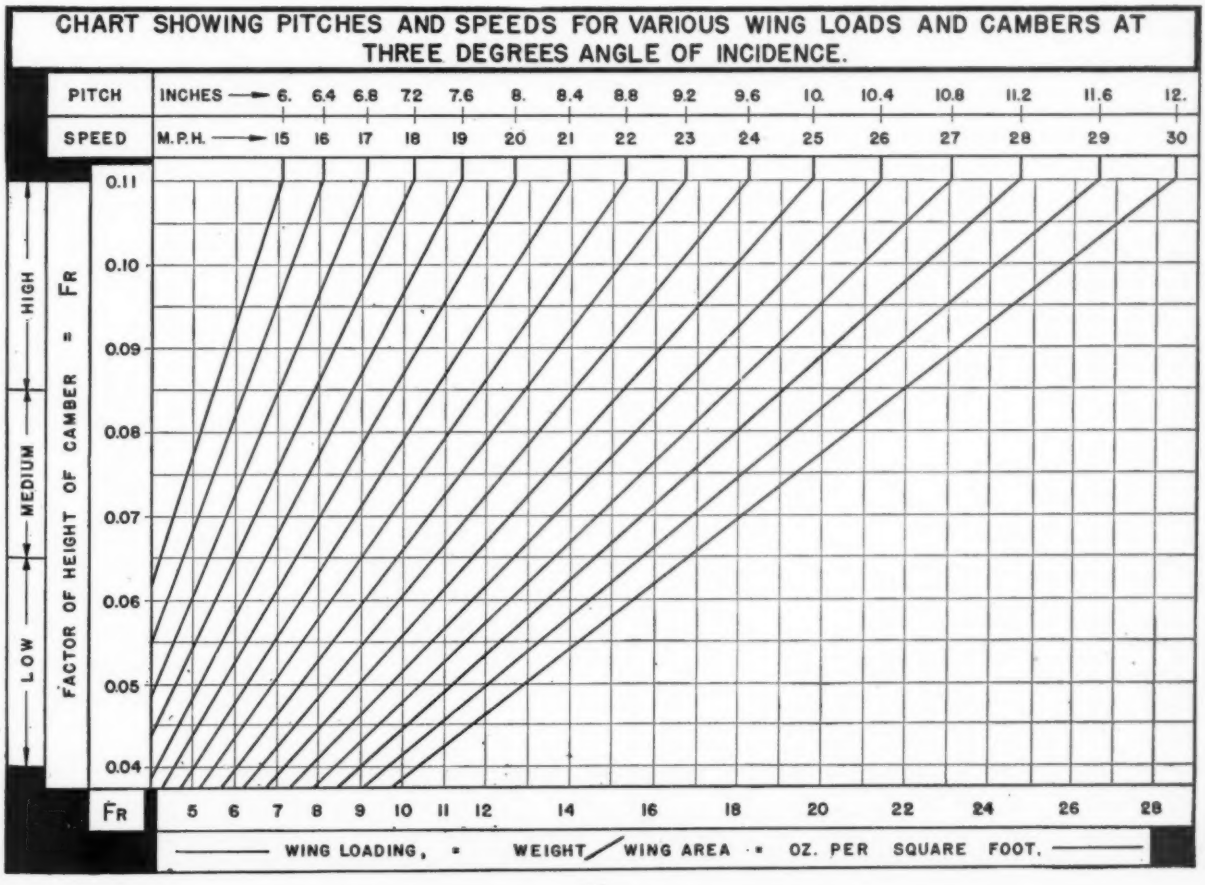
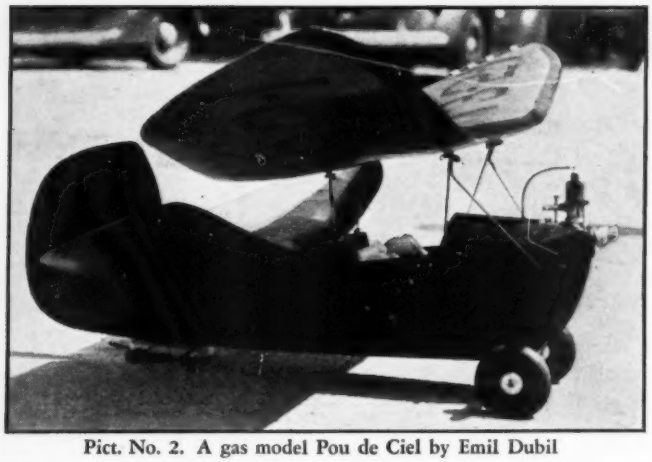


CHART SHOWING PITCHES AND SPEEDS FOR VARIOUS WING LOADS AND CAMBERS AT THREE DEGREES ANGLE OF INCIDENCE.
PITCH INCHES → 6. 6.4 6.8 7.2 7.6 8. 8.4 8.8 9.2 9.6 10. 10.4 10.8 11.2 11.6 12.
SPEED M.P.H. → 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
HIGH
MEDIUM
LOW
FACTOR OF HEIGHT OF CAMBER = FR
0.11
0.10
0.09
0.08
0.07
0.06
0.05
0.04
FR 5 6 7 8 9 10 11 12 14 16 18 20 22 24 26 28
WING LOADING, = WEIGHT / WING AREA = OZ. PER SQUARE FOOT.



Pict. No. 2. A gas model Pou de Ciel by Emil Dubil

National Aeronautic Association

Junior Membership News

Highlights of Planes at the Nationals and Official News from N. A. A. Headquarters

THE big news this month is that the American team which went to France to compete in the Wakefield Event, won the Wakefield Trophy. This brings it back to America, and consequently the 1939 Wakefield will be held in this country.

Pict. No. 1. Jim Cahill with his 1938 Wakefield contest winner

The young man who "did the trick" is James Cahill of 1419 North Gale Street, Indianapolis, Indiana. His official average time for three flights was 8 minutes, 11.6 seconds. Cahill used the plane which won the elimination trials in Detroit. This same ship also won the Moffett Event last year, and has won numerous other contests. Cahill, with his ship, is shown in picture No. 1. We all congratulate him on his great achievement.

The annual contest for the cup was held this year at Guyancourt Airport, near Paris. The six-member team of model champions who represented the United States in the meet competed against similar teams from the major countries of the world.

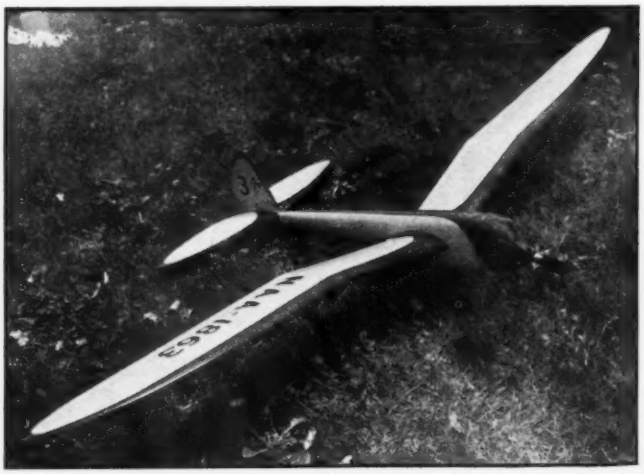
The Wakefield Cup was established by Lord Wakefield of England in 1927, and has been in international competition since that year.

By the rules of the contest, the American win brings next year's meet for the cup to the U.S., and it is expected to draw competing model teams from the principal countries of the world. The date and location within the U.S. of the 1939 contest will be decided by the N.A.A.

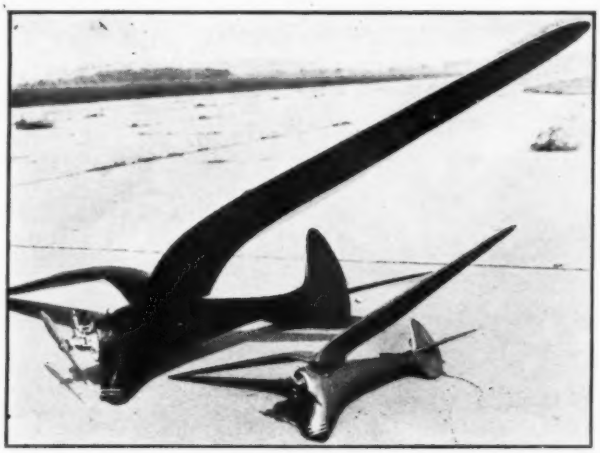
Pict. No. 10. Pat Sweeney, Chester Lanzo and Ben Porter look over the radio mechanism in Pat Sweeney's plane

The members of the American team were selected in open competition at the 11th National Model Contest, held in Detroit July 6th to 9th. Team members were: James

Pict. No. 5. Joe Calietto ready to launch his one-wheel peg-leg fuselage model



Pict. No. 6. Mike Roll's perfect gull wing gas model that placed fourth in the Berryloid Contest. Many expected it to place 1st



Pict. No. 3. Two gull wing gas jobs built by Winfield Davis (large one) and H. M. Shrieber, of Kansas City, Mo.

Pict. No. 4. Ken Peterson and his high stablizer gas model. It flew with great steadiness and passed out of sight in about 2 minutes, due to a stiff wind.

Cahill, Indianapolis, Ind.; James Bohash, Jr., Detroit, Mich.; George DeLaMater, Oneonta, N.Y.; G. J. Wisneiwski, Milwaukee, Wis.; Ted Just, Johnstown, Penna.; William Pfeil, San Antonio, Texas, and Henry Stiglemeier, Inglewood, Cal.

All except William Pfeil and Stiglemeier sailed for France on the President Roosevelt on July 20. Pfeil, who was unable to get to New York by that date, sailed on the New Amsterdam which left New York on July 23. Jim Cahill, "number one man" of the team, was designated team leader and manager by the N.A.A. Final arrangements for the sailing of the team from New York were made through the cooperation of MODEL AIRPLANE NEWS Magazine.

This year marks the first time in the history of the contest that America has been represented by a full team abroad. The participation of most members was made possible through the work of the national headquarters of the N.A.A., assisted by local N.A.A. leaders, in encouraging financial underwriting of members' trip expenses by home-town civic leaders.

The U.S. has previously held the cup three times; in 1930, '31 and '35.

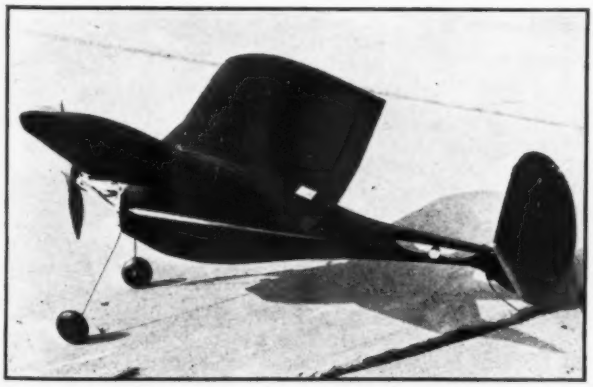
Pict. No. 11. Clinton DeSoto adjusts his radio equipment. His one horsepower plane may be seen at the right.

Pict. No. 9. Frank Zaic and his model with which he won the Moffett Trophy after many persistent attempts.

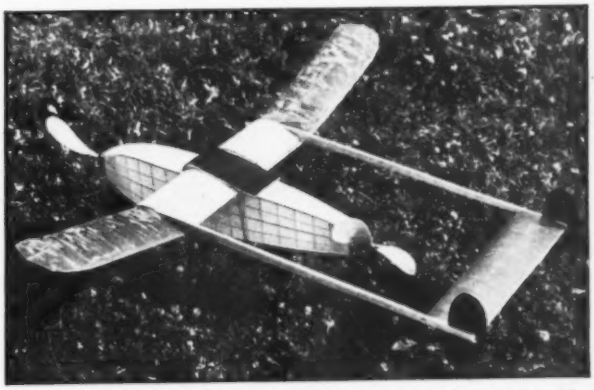
Last month we did not have the space nor the time to give you many of the highlights of the planes that appeared in the national contest, so it had to be put off until this month. On these pages you will see a number of pictures which will indicate the variety and style of planes that participated in the great national competition.

Picture No. 2 shows a model Pou de Ciel, powered with a Brown engine, built by Emil Dubil of Pittsburgh, Pa. Emil's favorite trick is to fly this ship indoors. A string is tied to the fuselage and carried out along the wing. The flier holds the string while the plane circles about its master.

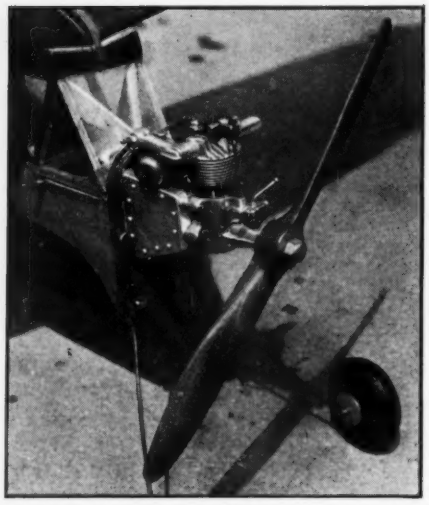
Picture No. 3 shows two beautiful gill wings from Kansas City, Missouri. The larger is thirteen feet and was built by



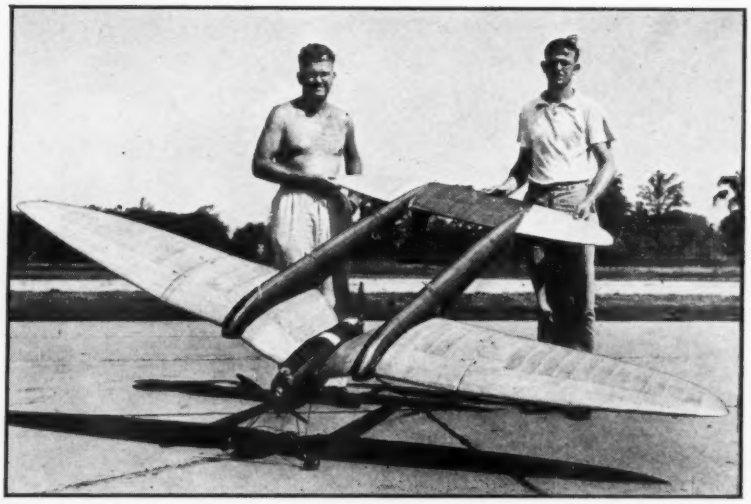
Pict. No. 7. This gas job by George Ahlander looks like a flying leaf because of its wing of very low aspect ratio.



Pict. No. 8. This is Ed Beshar's pusher-puller rubber job with which he made a bid for the Stout Trophy. It flew well.



Pict. No. 12. Casimir Leja's four cycle engine. It was the only one at the contest



Pict. No. 13. Roy Marquardt, his helper and his twin engine gas model, unique in the fact that the fins below the stabilizer gave it straight flying qualities

Winfield Davis; the smaller is sixty-six inches and built by H. M. Schreiber. The larger one is powered with a Forster engine and it flew with great steadiness like an immense bird.

Picture No. 4 shows Kenneth Peterson's high-stabilizer job. Kenneth lives at 13512 Rutherford, Detroit, Michigan. He designed his ship from the data given by Mr. Grant in MODEL AIRPLANE NEWS Possibly some model fans may recognize it from the drawing appearing in this magazine. One significant change was that Ken raised the stabilizer so it would be out of the down-draft of the wing. The model flew beautifully without wavering a moment. It is extremely steady and flew out of sight after about two minutes, due to the extremely strong wind blowing at the time.

Picture No. 5 shows Joe Calietto of Farmingdale, New York, ready to launch his one-wheel fuselage job. One-wheel jobs appeared to be quite prevalent at the national contest.

Picture No. 6 shows Mike Roll's beautiful gull wing which was entered in the Berryloid contest. Many believe that Mike should have won the contest with this ship. He placed fourth.

An unusual job is shown in picture No. 7. This is a bat wing built by George Ahlander of 6150 Newport Avenue, Chicago, Illinois. Ahlander endeavored to get a ship which would float in like a leaf and also satisfy his curiosity regarding the performance of a very low aspect ratio gas model. We do not know the results of the flights of this model.

Now we jump to the rubber class. Picture No. 8 shows Ed Beshar's "pusher-puller" which he entered in the Stout Event; and strangely enough, it did a very good job of flying. Beshar is a young man with original ideas.

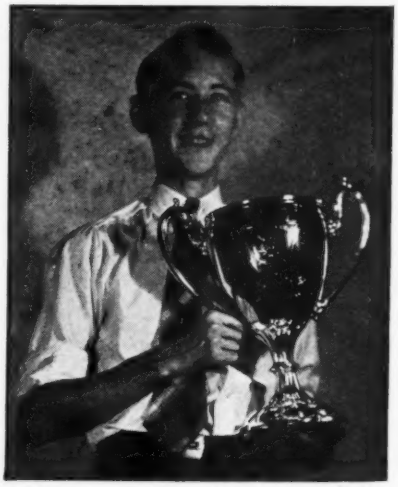
Picture No. 9 shows "American's traveling delegate," Frank Zaic of New York City, with the model with which he won the Moffett Event. Frank has been taking "pot shots" at contest events for a number of years, but up to this time fortune did not favor him. However at the Nationals he "crashed through," and his smile now is broader than ever.

Pict. No. 14. Ed Manning and his tailless gas model. This ship made a number of very stable fine flights. It recovered quickly from dangerous attitudes

Picture No. 10 shows Pat Sweeney's radio job. It is a converted Cavalier, the original of which was designed by Ben Shereshaw of Newark, New Jersey. In the picture are Pat Sweeney, Chester Lanzo, who won last year's contest and Ben Porter, the radio operator. Sweeney did not fly his ship because of the gusty wind blowing at the time of this event.

Another radio entry was that of Clinton B. DeSoto, assistant secretary of the American Radio Relay League, West Hartford, Connecticut. Picture No. 11 shows him busily engaged adjusting his set. The fuselage of his plane shows at the right. It is powered with a two-cylinder Forster, which develops about one horsepower. The ship was the largest entry in the contest, but DeSoto did not fly his model.

Picture No. 12 shows the only four-cycle engine which was entered in the meet. It was built by Casimir Leja and Jack Feeney of Chicago, Illinois. It operated beautifully both on the ground and in the air, and was a fine specimen of machine work.



Walter Lees, winner of the Drexel Biddle Cup, for the longest flight of the season in the P.M.A.A.

In Picture No. 13 you can see Roy Marquardt's twin-engine gas job. One engine is in the front and the other at the rear of the nacelle. The ship is quite large, as you can see, and is unique inasmuch

(Continued on page 28)

"Gas Lines"

Official Sections of the National Aeronautic Association Gas Model Division

Pict. No. 1. Mr. Bunch launches a gas model hydro. He says gas models are very adaptable to seaplane design. No crashes have resulted.

All old members of the I.G.M.A.A. who are now members of the N.A.A. are eligible for membership in the Society of Gas Model Pioneers. A membership certificate will be issued shortly to all who verify their membership in the I.G.M.A.A. and N.A.A. It will be given in recognition of their pioneer work and their spirit in cooperating with the endeavor to organize Gas Model Flying on a cooperative basis under the N.A.A.

Pict. No. 3. A beautifully designed and constructed biplane gas model built by Robert Potter. This ship required about 700 hours to complete.

A GREAT deal of the gas model news of recent days comes from the 1938 National Competition, and though "Gas Lines" is the official column of the N.A.A. gas model division, news of the Nationals was so connected with rubber powered activities that all National Competition news may be found under the N.A.A. column this month.

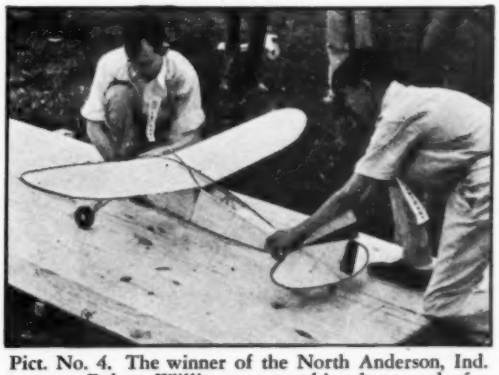
Considerable has happened among the builders who did not attend the contest in Detroit. Dan Bunch of 5009 South Hoover Street, Los Angeles, California, has been doing a great deal of experimenting with gas model seaplanes and has had phenomenal results. In fact, your editor, as well as he, feels that gas models are more adapted to seaplane construction than to land plane types. The floats low below the fuselage contribute a great deal to the stability of the plane. They lower the center of lateral area and the center of gravity to correct relative positions. Picture No. 1 shows Mr. Bunch in the act of launching one of the seaplanes with which he has been experimenting. We will let him tell you in his own words something about it and the tests which he has made.

"The greatest possibilities and real thrill of gas job flying has not been scratched yet. The real sport of gas model flying has only been tasted by those who have successfully flown seaplanes.

"This fact has been fully demonstrated and really admitted by those who attended the world's first Gas Job Seaplane Regatta, which was held at Tulare Lake the week-end of

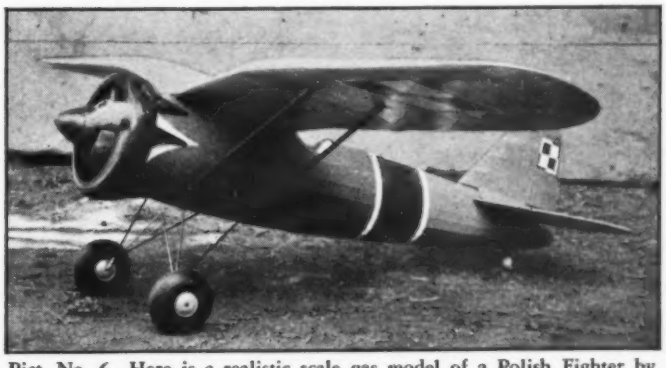
(Continued on page 59)

Pict. No. 2. Ralph Lowe and his "V" tail finless gas model. It flies perfectly.



Pict. No. 4. The winner of the North Anderson, Ind. contest; Robert Williamson gets his plane ready for flight.

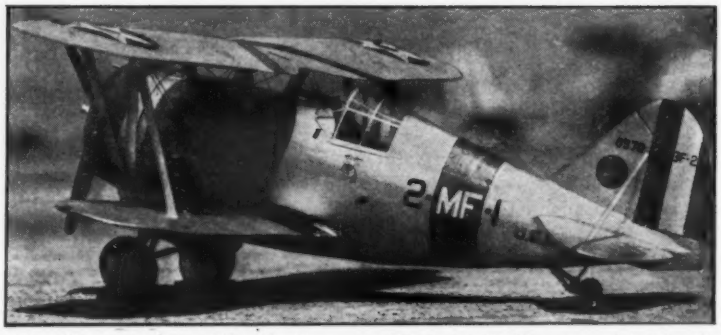
Pict. No. 5. Owen Chapman and Don Donahue's three year old gas job that has placed in many contests.



Pict. No. 6. Here is a realistic scale gas model of a Polish Fighter by Ralph Guernsey. This design is very adaptable to flying jobs.

AIR WAYS
HERE AND THERE

What Readers Are Doing to Increase Their Knowledge of Aviation in All Parts of the World. Tell Others What You Are Doing



Pict. No. 1. A fine solid scale Grumman F3F-2, by C. Morgan and J. Terrell.

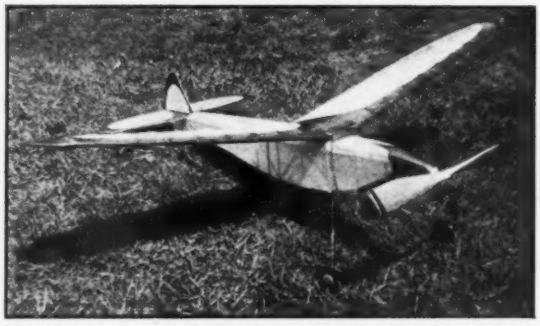
Air Ways Club News

IT IS quite possible that Air Ways Club members have felt neglected, inasmuch as no special Air Ways column appeared last month. However the national contest news actually is Air Ways news, and many Air Ways Club members were among the 700 entrants who competed. Now that the 1938 Nationals is a thing of the past, we can "drop in" on some of our obscure but none the less important Air-Ways Club members who did not attend the meet.

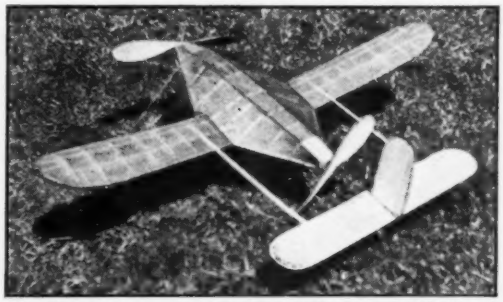
It has not been because of lack of material that the Air Ways column has been small of late, but rather because of a lack of good pictures. Many pictures sent to us are very indistinct, out of focus or have a background which distorts and obscures the object of the picture. If you want your picture printed don't forget to send good pictures. In this way the Air Ways column will have a better appearance and justice will be done to your model or to yourself, which ever may be shown in the picture.

In a past issue we gave the news that James Cahill of 1419 North Gale Street, Indianapolis, Indiana, won the Air Ways Trophy. It appears that Jim is not a subject of the whims of nature, for he won the Wakefield elimination contest at the Detroit Nationals with the same ship that won this Air Ways Trophy. Now, as we go to press, we hear that Jim's sojourn to the Wakefield Competition in France has resulted in first place for him against contestants from all other nations. In other words, Jim won the Wakefield and brings the cup back to America. On behalf of its readers and staff, MODEL AIRPLANE NEWS extends to him its heartiest congratulations.

One of the finest contributions to Air Ways this month is a solid scale model of a Grumman fighter, F3F-2, built by C. J. Morgan and J. I. Terrell of VMF-2, Air Two, Naval Air Station, San Diego, California. They tell us that



Pict. No. 3. A well designed sportster by one of our "Early Birds," Mr. Wm. Bouldin.

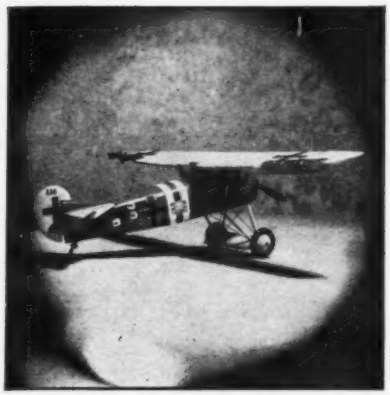


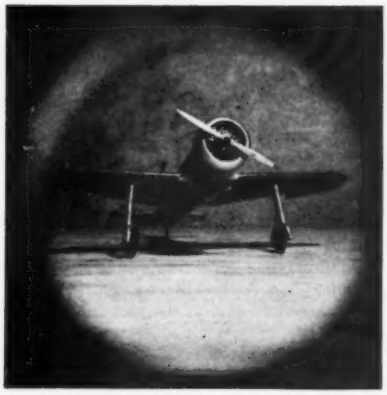
Pict. No. 10. A unique "pusher-puller" model designed and built by Ed. Beshar. The body contributes to the lift of the wing.

Pict. No. 2. Ruth Pakula who designs, builds and flies her own models.

Pict. No. 6. The Air Ways Trophy and Jim Cahill's model which won it, as well as the Wakefield.

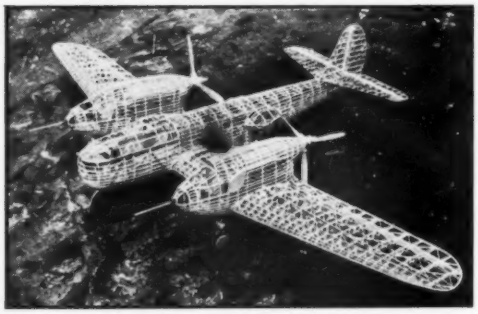
Pict. No. 5. Winners of the Loew's Theatre "Test Pilot" Model Contest with their models and trophies. L. to R. George Iaccino, Carl Baum and Frank Fisher.





Here are three exceptionally fine models built by Stephen Lambert Jr. Pict. No. 7 (Left) is a realistic Fokker D-8. Pict. No. 8 (center) is a Hughes racer with retractable landing gear and Pict. No. 9 is a Howard Mike racer.

Pict. No. 4. Mr. Erwin Young and his "Clippers," nearly big enough to fly in.



Pict. No. 11. Here's a real piece of frame construction. A Bell Fighter by Julius Toth.

these fighters are used only by the marine corps. The picture shows how carefully the model has been constructed. Not many models will stand such a close-up shot as shown here, without reflecting many defects.

Picture No. 2 shows one of our expert women model fans, Miss Ruth Pakula of New York City, who holds one of her models of original design which she has built. She has been building models for two years and is a "dyed in the wool" fan. Miss Pakula hesitated to submit this picture herself. However a young man who is less bashful and appreciates her good work, presented it to us for insertion.

One of the worse things that you can say about any model builder is that he builds "toy" airplanes. In fact, such a remark immediately classifies the one from whom it originates as an ignoramous concerning model affairs. Usually such remarks eminate from older mouths, whose heads are supposed to be wiser than the younger generation's. However, there is one "older head" that we know of who has been working with models for many years. In fact he is one of the "Early Birds," which means that he flew a large plane before 1916. This gentleman is Mr. William Bouldin, 3rd, of 169 Prospect Street, East Orange, New Jersey. He has never gotten over the bite of the "aeronitis bug," for a large part of his time is spent in working out aernautical ideas in model form. He contributes picture No. 3, which shows one of his latest fuselage jobs. This is not a contest ship but a sportster; Mr. Bouldin gets the greatest pleasure in flying for fun. The little plane has a wing spread of thirty-two inches and flies on eight strands of 1/8" flat rubber, which turns

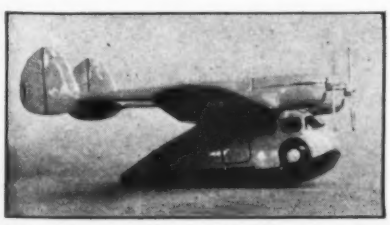
(Continued on page 55)

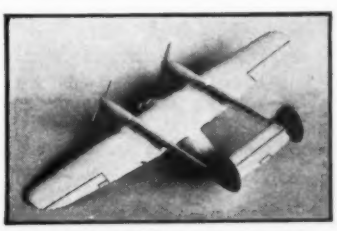
The Original Design Contest

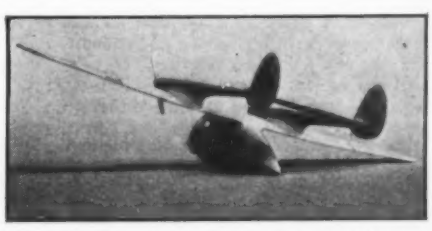
In one of our past issues an award of $5 was offered, to be given each month, to the young man who sent pictures of his model, which embodied what we feel to be the greatest amount of originality of design. We have received a considerable number of these designs, some solid scale designs and others flying models. This month only those representing large ships will be considered. Next month we will give the award for originality in design for flying models. This month's winner is Elbert J. Weathers, 2720 Poinsettia Drive, San Diego, Calif., one of our old friends. He sends us three pictures of the plane which he submitted in the contest, and they appear at the bottom of this page.

The award has been given to him not only because of the originality of his design, but because of its practicability. As you can see it is a twin-engine amphibian. Amphibians are usually heavy;

(Continued on page 38)







Here are three views of the October winner of the Original Design Contest. The model was built and the pictures submitted by our old friend Elbert J. Weathers. He wins the $5.00 award.

N.A.A. News

(Continued from page 24)

as the fins extend down from the stabilizer rather than upward. This feature of design gives it its unusual quality of flying absolutely straight. Franz Broeg constructed the model. Both these young men are from Burlington, Iowa.

One of the tailless jobs which operated beautifully is shown in picture No. 14. It was built by Ed Manning, a photographer and model builder living in Detroit. After the first flight, in which it was not well adjusted, the model flew with exceptional stability and gave several hundred spectators a real thrill.

Wichita Holds Meet

Under sponsorship of the Junior Chamber of Commerce, with N.A.A. members and officials of Kansas cooperating, a meet was held at the Wichita Municipal Airport on June 12th. Sixty-five contestants were entered.

Binghamton Meet

Despite stormy weather, with high winds and several downpours of rain, a meet was held at Binghamton, N.Y., on June 5th, sponsored by the Exchange Club.

First, second and third place winners were Kale Harden, Martin Dotsko and Clement Buell, respectively. They were offered trips to the National Meet with all expenses paid.

Following the contest, E. A. Link took all the contestants and officials of the meet for a flight in his tri-motored Ford.

Bill Berry is lining things up in swell style for his coming 2nd Quaker City invitation meet to be held on Sept. 10th and 11th . . . "knuckle busters" from all over are invited, as the meet is not confined to the eastern states . . . there'll be quite a lot of novel features to the show. The Aero-Philatelic Society of the N.A.A. is being organized now as a special chapter . . . Aero-Philatelists or cover collectors are invited to come in now and become charter members; fee for N.A.A. members is $1.00 in addition to the regular dues . . . all members who join now are still eligible to receive free of charge two of the McFadden Planned Flight Contest covers carried from Tampa to the Miami Air Races.

Howdy to new chapters from all over the country . . . to wit: Northern Indiana Gas Model Association; Waco Gas Model Association, Texas; Milwaukee Model Association; Miami Junior Aero Club; Racine Junior Chap., Wisconsin. How many fellows did their own laundry at Detroit? We have seen some pictures that ought to be good for hush money . . . quite a party, that . . . Art Vhay deserves a big hand for the smooth way in which it went off.

Some of the recent successful meets: Wichita, Kansas, and about five-thousand spectators; tow-line glider was on the program . . . that event always held particular interest for some; never any motor trouble.

Word from Hawaii indicates that a group of gas builders down there are interested in flying with the N.A.A., and it brings back memories of what those boys used to do with rubber models; remember? If they do come after these records there'll be some hot times in several of the old towns this year.

New Contest Directors

Fifteen new contest directors for model aircraft have recently been appointed by The N.A.A. Their names and addresses follow:

John L. Scherer, East Rockaway, L.I.; R. D. Blyth, Meridian, Miss.; R. C. Rodolsky, St. Louis, Mo.; Elmer Westerlund, Jackson Mich.; Gaylord H. Webster, Phoenix, Ariz.; Michael Vetrano, Manchester, Conn.; David H. Hunt, Columbia, Conn.; Clyde E. Cole, Flint, Mich.; R. N. McCallam, Binghamton, N.Y.; Arthur Vhay, Detroit, Mich.; Allen Turner, Brooklyn, N.Y.; Elmer Riemer, Milwaukee, Wis.; Claude A. Carr, Washington, D.C.; Theodore Dove, Nangatuck, Conn.; L. B. Bush, 406 Securities Building, Omaha, Nebr.

Gas Model Insurance Available!!

The N.A.A. takes pleasure in announcing that it has succeeded in helping to make gas model insurance available to members in good standing of the N.A.A. Gas Model Division.

The plan, based on $1,000 of insurance ($500 each for Public Liability and Property Damage Liability), will be effective as soon as 500 applications are received, with the benefits subject to a substantial increase when 1,000 or more are signed up.

This insurance is available *only* to N.A.A. Gas Model Members in good standing, and is applied for by sending one dollar to the National Aeronautic Association, Dupont Circle, Washington, D.C., together with a note stating that it is to be applied to gas model insurance. It is to be understood that the deposit of one year's premium amounting to $1.00 may be returned in the event that an insufficient number of applications are made, and that the insurance will not be effective until 500 applications are made.

This plan includes extension of the benefits of the insurance to the parents of minor children and N.A.A. Contest Directors.

Next month a thermometer will be published showing the number of members who have taken this protection, and each month thereafter until the minimum number of required members has been reached. Rush yours in today!

Beginning August 1, new members to the Gas Model Division of the N.A.A. will receive with their membership credentials, one set of four-inch decalcomania N.A.A. numerals for their assistance in identifying their ships.

A. M. A. Appointments

The following Academy of Model Aeronautics committee appointments have been made for 1938:

Power Plane: Edward Roberts, chairman; Henry Stiglmeier, Joseph Konefes, and Charles Grant.

Rubber: Carl Goldberg, chairman; Roy Wriston, and Hewitt Phillips.

Scale Section: Paul Garber, chairman; Harry Copeland and Roger Hammer.

National Contest: H. M. Jellison, chairman; Miss Frances Alexander and Arthur Vhay.

National Conference: H. T. Sommers, chairman; Victor Fritz and Walton Grubbs.

National Awards: Capt. Willis Brown, chairman; Irwin Polk, Ed Clarke, and Charles H. Grant.

International Coordination: Gordon Light, chairman; and Philip Zecchitella.

Publishers: William Enyart, chairman; Colin Cameron, Charles Grant, Philip Zecchitella, and C. B. Colby.

Academy Votes For Eight-Ounce Wing Loading

By a majority vote, members of the Academy of Model Aeronautics have selected eight ounces per square foot as the wing loading for gas models flown under N.A.A. supervision.

The Academy's reasons for lowering the ten-ounce rule were simply the demands made for recognition of small gas models powered with midget engines.

The results of the national meet should furnish an interesting comparison with the marks set last year.

Academy Of Model Aeronautics Report

The Academy of Model Aeronautics held a meeting Thursday, July 7th in the Rose Room at the Hotel Fort Shelby, Detroit, Michigan. President Albert Lewis presided. The following resolution was adopted:

Be it resolved that the Academy of Model Aeronautics issue rules for model aircraft competition on January 1st, and that the rules be in effect for twelve months.

New rules may be added to meet new conditions.

The following propositions were made for consideration by the Academy at their next regular meeting. The Academy desires to obtain your ideas and viewpoints on the questions listed below. Will you be so kind as to fill them in and mail them to Albert Lewis, Academy of Model Aeronautics, Kennison Road, Sommerville, Mass. It is important that these questionnaires be sent in, so that the Academy may get a true picture of your opinions. If you agree or disagree with any proposals, please state so, and add your suggestions. This is your opportunity to express your desires. Don't fail to take advantage of it.

Rubber Powered Models

Indoor Rules

It is felt that the Indoor Rules are adequate as they are and need not be changed.

It is felt that the Indoor Glider Rules are also adequate and should remain as they are.

The Academy wishes to entertain proposals for new Indoor Flying Scale Model Rules.

Outdoor Rules

It is felt that the Outdoor Stick and Outdoor Cabin Model rules are adequate and should remain as they are.

It is suggested that the Outdoor Glider

(Continued on page 63)

A Two Purpose Record Wrecker

Here's How You Can Build a Duplicate of an Indoor Plane for Low Ceilings That Has Captured an R.O.G. and an R.O.W. Record As Well As Establishing Another Record for High Ceilings

By WILBUR TYLER

MAYBE this model is lacking in feminine pulchritudity, but once it takes to the water it'll beat the best bathing beauty by a mile. As a low-ceiling flier the little record-wrecker set Boston marks in both the senior and junior Class A rise-off-water categories. The plane's designer, Ralph Brown, first set a junior record of 5 minutes, 58 seconds; and several months later made a senior mark of 5 minutes, 48 seconds—both flights being made under a 35-foot ceiling.

Substituting wheels for floats and removing the rear pontoon, Brown hung up a Boston Class A rise-off-ground junior record of 7 minutes, 33 seconds. In the summer of '37, in the huge Akron Airdock, the same ship set a national junior R.O.G. record of 12 minutes, 27 seconds. This was the first time it had flown under a ceiling exceeding 35 feet, yet the only change was in the size and length of the rubber motor.

If you, too, want to be the "life of the party" and set a new hydro record for your club here's how:

The stick is made from a quarter-grained sheet of 1/64-inch balsa which is bent around 1/8-inch drill rod. Each end is capped with 1/32-inch thick balsa. Metal fittings are bent from No. 14 wire and cemented to the stick. Taper the tail boom from 1/16-inch diameter at one end to 1/32-inch diameter at rear. The rudder is built onto the boom and covered with microfilm. The stabilizer is made, cemented to the boom, then covered with film. Glue the boom to the stick so the rear is elevated 1/4-inch and offset to left 1/4-inch to circle model with torque. Pontoons and float are made from 1/32-inch square balsa strips and covered with superfine tissue, then doped twice with banana oil.

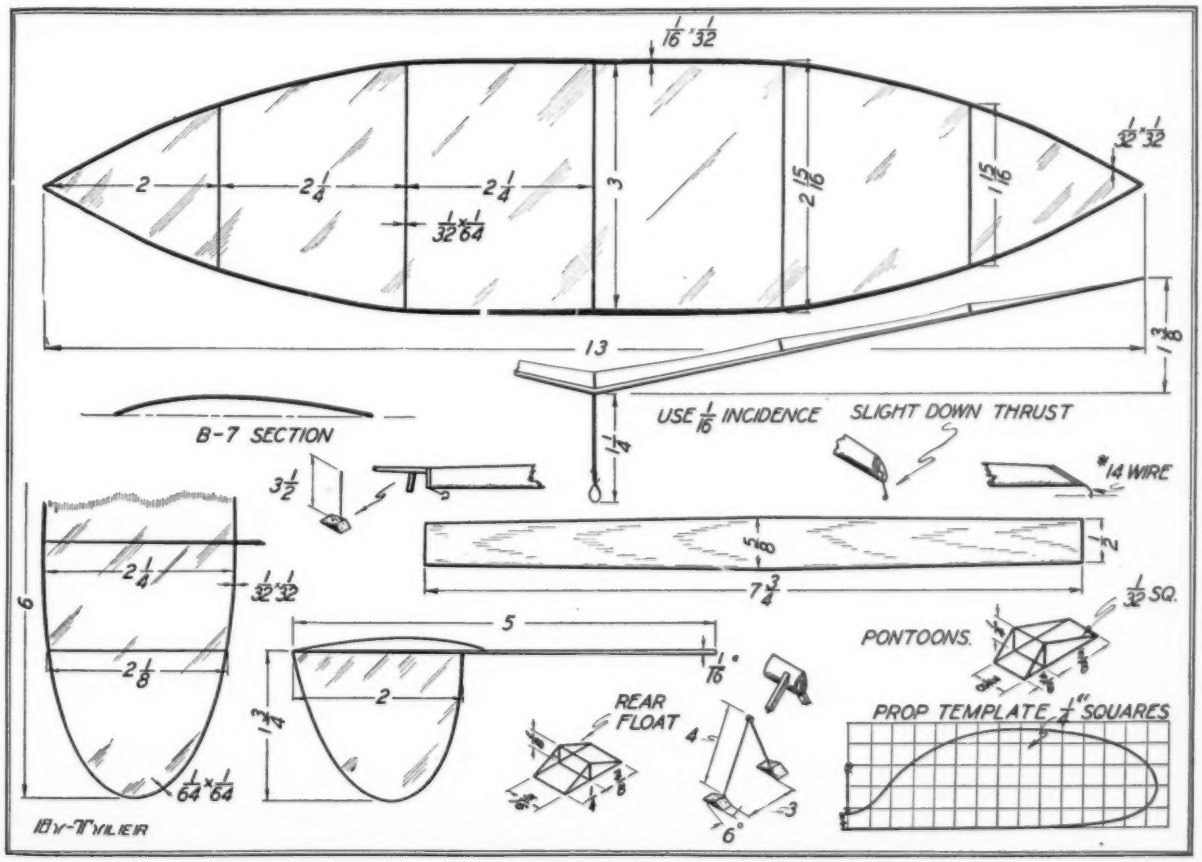
Float struts are round 3/64-inch balsa and beveled to fit the motor stick as shown. Wing is conventional construction with spars sanded to conform to airfoil curve. Wing struts are round 3/64-inch balsa. Aluminum clips hold struts to the stick.

Prop block is quarter-grained 7 1/2 x 1 1/8 x 5/8-inches. Use 3/32-inch camber in propeller. The shaft is bent from No. 14 wire. Weights of completed parts: wing, .005; prop, .005; motor stick, .004; tail surfaces and boom, .002; floats and struts, .003.

For low-ceiling off-the-water flying use 3/64 x 1/30 x 12-inch loop. High ceiling will call for 1/16 x 1/30 x 12-inch loop. If wheels are substituted for floats experimentation will determine proper size and length of the rubber motor.

So there she is already for her launching—don't forget to bring along a bathing suit!

Write and Tell Us The Type of Plans You Prefer



The Hybrid Airplane Contest No. 3

Here Is the Third and Last Series of Three-View Drawings of Hybrid Airplanes for You to Solve. If You Have Not Already Entered the Contest, Do So Now. Send for the First and Second Set of Contest Three-Views

By NICK LIMBER

AS THIS is the last issue in which the contest plans will appear, it is appropriate that all contestants at this time be thanked for doing their part in making this contest a complete success. Although it was anticipated that the nation's model fans would go for the contest in a big way, the results are far beyond our expectations.

Not only have the modellers accepted these composite airplanes in contest form, but many have and are making models of these unique airplanes. Many more are preparing their own composite airplane plans and are finding as much enjoyment in this as did the author when designing the "hybrids" for the contest.

Answer blanks have been pouring in from all parts of the country in such great numbers that we wish to again call your attention to the fact that accuracy and neatness of these blanks will play a major role in the selecting of the winners. Make certain that your chances for an award are not ruined by poorly presented answer blanks. Also make certain that the blanks are mailed in time to reach this office before the deadline.

Care must also be taken that the name of the airplane is spelled correctly.

As the contestants are by now familiar with the method of solving the diagrams, this last set should prove simpler to solve and less time will undoubtedly be required. Do not, however, mail your answers too hurriedly. Make certain as to their accuracy by checking and rechecking. Remember that this is your last chance for high scores and chance for award, do not rush.

A complete list of the proper answers will be published, with the names of the winners, as soon as the competition has ended. Winners of the cash awards will be notified by mail the moment they are selected. Their checks will also be mailed as early as possible and will be made out to the winner's name as it appears on the answer blanks. (Make certain your name is clearly indicated on the answer blank if you are interested in seeing it on the award check.)

The contest officially closes on November 2, so be sure you are officially eligible for an award by mailing your last set of answers before that deadline.

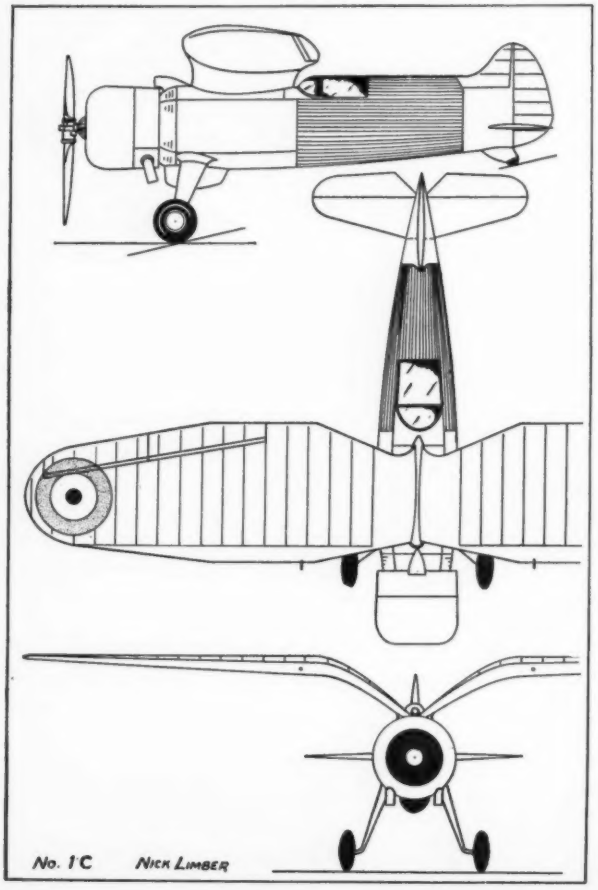
For more complete information concerning contest procedure, read the details presented in Hybrid Contest No. 1, August issue of MODEL AIRPLANE NEWS.

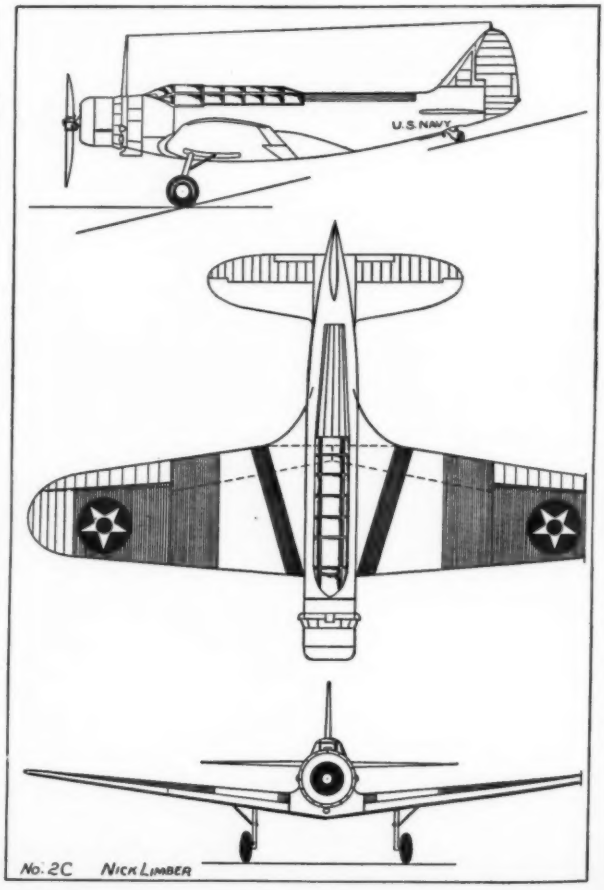
Rules and Regulations

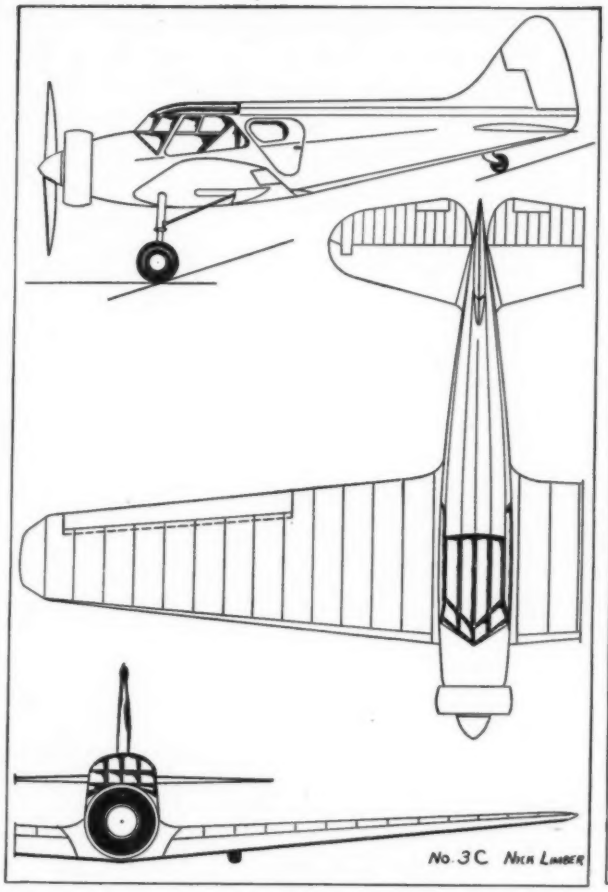
1. Each month for three months a number of three-view drawings of hybrid airplanes have been presented. The contest started with a set of three plans in the August issue. Contestants must submit answers to all three sets of diagrams in order to be eligible for an award.

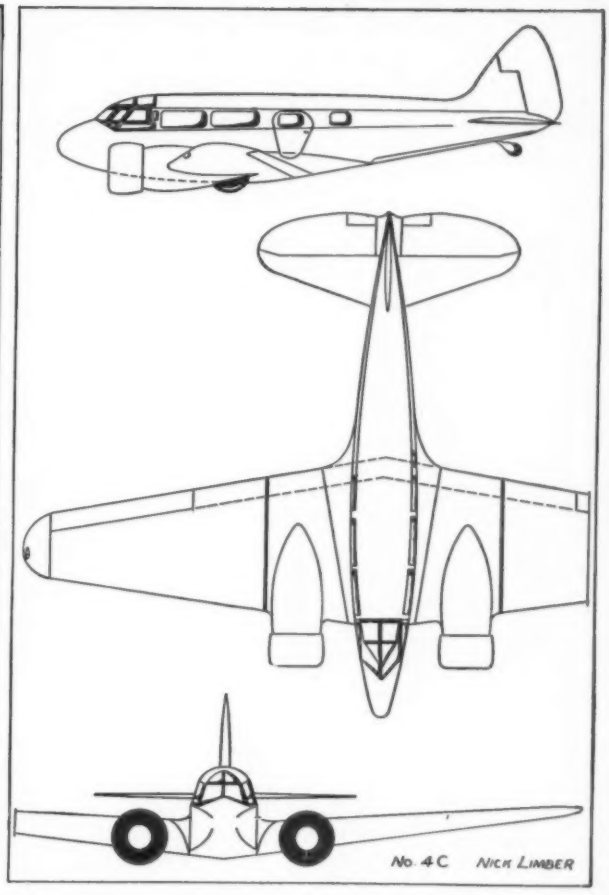
2. Answers for the first set of plans that appeared in the August issue of MODEL AIRPLANE NEWS were to be mailed to the office of MODEL AIRPLANE NEWS, 551 Fifth Avenue, New York City, not later than midnight, August 19. Answers for the second set of plans appearing in the Septem-

(Continued on page 40)









Answer Blank for Diagram No. 1 C

Insert name of plane to which the following parts belong.

Fuselage.....

Wing.....

Rudder.....

Elevators.....

Name..... Age.....

Address.....

City and State.....

Answer Blank for Diagram No. 2 C

Insert name of plane to which the following parts belong.

Fuselage.....

Wing.....

Rudder.....

Elevators.....

Name..... Age.....

Address.....

City and State.....

Answer Blank for Diagram No. 3 C

Insert name of plane to which the following parts belong.

Fuselage.....

Wing.....

Rudder.....

Elevators.....

Name..... Age.....

Address.....

City and State.....

Answer Blank for Diagram No. 4 C

Insert name of plane to which the following parts belong.

Fuselege.....Consolidated A-11.....

Wing.....Northrop A-17-A.....

Rudder.....Consolidated A-11.....

Elevators.....Lockheed Vega.....

Name.....Jack Doe.....Age....18 years...

Address.....909 Marks Street.....

City and State.....New York City, N. Y.....

SCIENTIFIC DESIGN AND MATERIALS

"THE EAGLET"— *Truly the Finest Midget Gas Job Offered to the Gas Model Builder Today*

DESIGNED FOR USE WITH MIDGET GAS ENGINES

Wingspan 44" Length 32" Flying Weight 17 oz.

The trend in the size of gas models today is towards a ship of about three to four feet wingspan and corresponding light weight. The "Eaglet" is the foremost exponent of this trend. This is just the type of model that any builder can fly in fields of restricted size.

This model's design is so simple that even the novice will have no difficulty in assembling the kit parts, and the expert will delight in the ease and speed at which he can complete the ship. The "Eaglet" requires only about one-third the time required to build larger gas models.

The kit is complete, and includes full size plans, M & M Pneumatic Wheels, 10" semi-finished propeller, printed parts, liquids, etc.

$3.95 POST-PAID
Or At Your Dealer's Including M & M Pneumatic Rubber Wheels

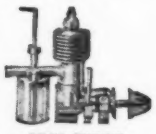
Take The Hint

Power Your Eaglet with Any One of These Midget Engines

BRAT TROJAN JR. SYNCHRO BEE M & M
PEE-WEE ELF

Any one of the above engines is of proper size and horsepower for use with the "Eaglet" and brilliant performance can be expected from the model with any of these recommended motors.

The Brat, Trojan Jr., and M & M motors are sold complete with the correct type of propeller, oil, instruction booklet and an iron-clad double guarantee.



BRAT ENGINE
3¼" High, 15/32" Bore, 1/2" Stroke. 1/10 H.P. Postpaid **$16.50.**

TROJAN JR.
3½" High. 5/8" Bore, 1/8 H.P. Light Weight — Powerful. Postpaid **$18.50.**

SYNCHRO BEE
3½" High, 1/2" Bore, 5/8" Stroke, 1/4 H.P. Postpaid **$12.50.**

M & M
21/32" Bore. 22/32" Stroke. Total Weight 7/8 oz. Postpaid **$17.50.**

CURTISS HELL-DIVER

SCIENCE CRAFT MODEL AIRPLANES

Rubber Powered
PRICE 50c EACH POSTPAID

ALL 28 MODELS ARE GUARANTEED FLYERS

H-1 Waco Custom Cabin
H-2 Monocoupe 90-A
H-3 Waco F-5
H-4 Curtiss Hell-Diver
H-5 Waco "D"
H-6 Curtiss Hawk P6-E
H-7 Mr. Mulligan
H-8 Grumman Fighter
H-9 Art Chester
H-10 Fokker D-7
H-11 Curtiss Fighter
H-12 Boeing Fighter
H-13 Curtiss Cyclone
H-14 Bellanca Pacemaker
H-15 French Pursuit
H-16 Japanese Fighter
H-17 Vance Flying Wing
H-18 Army Douglas
H-19 Nieuport Scout
H-20 Curtiss Goshawk
H-21 Fairchild Model "22"
H-22 Waco Y.K.C.
H-23 Howard "Ike"
H-24 Waco Model "A"
H-25 Fairchild Cabin
H-26 Vickers Jockey
H-27 Stinson Reliant
H-28 Boeing F4B-4

WINGSPANS 20"—BRIDGE TYPE LANDING GEAR

This Model Holds Championship of France With a Flight of
1 Hour 20 Min.

RED ZEPHYR

THE BIGGEST KIT VALUE EVER OFFERED IN THE GAS MODEL FIELD

See It at Your Dealers

NOW ONLY **$4.95** POSTPAID (Less Wheels)
With 3½" Pneumatic Rubber Wheels $5.95 postpaid

"MISS AMERICA"—THE GAS MODELER'S SWEETHEART

This Model Formerly Sold For $9.50—Now Sensationally Low Priced With a Pair of 3½" Pneumatic Rubber Wheels at $7.50

NOW ONLY **$7.50** P.P.

Wingspan 7 ft. **Length 54 in.** **Weight (Less Motor) 2¾ lbs.**

Still The Nation's Biggest Kit Sensation

Kit is complete with 3½" pneumatic wheels and finished prop. If you want a reliable flyer for general sport or contest flying, ask your dealer to show you this "Miss America" model or order direct from Scientific.

"MISS PHILADELPHIA"

Wingspan 96 in. Length 57 in.

This is a duplicate of Maxwell Bassett's contest winning model. The kit is complete with ready-shaped leading and trailing edges, finished balsa ribs, finished hardwood prop, and 3½" pneumatic rubber wheels.
Complete kit.....$9.95
Postpaid Less Motor

PURCHASE YOUR GAS ENGINE FROM SCIENTIFIC AND BE PROTECTED BY A DOUBLE GUARANTEE EACH ENGINE FULLY GUARANTEED BY THE FACTORY, AND IN ADDITION ALSO BY SCIENTIFIC

THE NEW BROWN JR. MODEL D GAS ENGINE

Power conventional size Gas models with this powerful performer

GENERAL SPECIFICATIONS

7/8" Bore, 1" Stroke; 1200-10,000 R.P.M. Height 4¾", 1/2 H.P., Weight ready to run with gas, two batteries, and propeller 20½ oz.

This high powered, light weight engine is constructed of the finest materials, and includes an alloy steel cylinder, an aluminum alloy piston fitted with two compression sealing rings, forged aluminum connecting rod, die cast crank-case, and simplified pin type control. Complete engine with fuel tank, coil, condenser, and instruction manual, and Scientific's double guarantee.

ONLY **$10.00** POSTPAID

MODEL B
Long famous for power, smooth running, and high compression. Piston is ground and precision lapped with cylinder to give a perfect fit. Engine complete ready to run
$21.50
Postpaid

NOW SYNCRO ACE ONLY
$13.75 Postpaid

7/8" Bore, 15/16" Stroke 1/2 Horsepower. Speed 800 to 8,000 R.P.M.

Fitted with oil-lite bearings, streamlined fuel tank, and enclosed crank-case.

DENNYMITE DE LUXE MODEL
Has aluminum outside exhaust, dural mounts, etc.
$17.85.

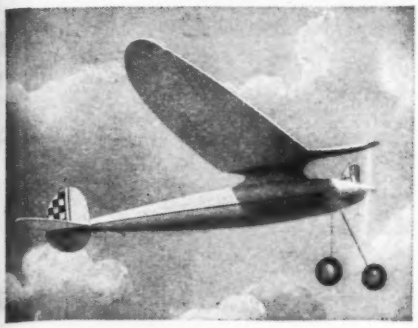
STANDARD MODEL
As illustrated, plus battery, spark coil & condenser.
$15.85.

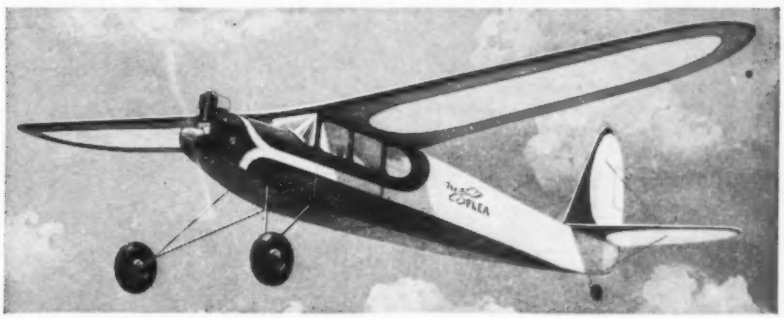
UNIT ONLY
Less coil and condenser
$13.85.

WILL HELP YOU WIN THOSE "MEETS"

"Go Scientific"

THEY LOOK LIKE GAS MODELS, FLY LIKE GAS MODELS, AND SOUND LIKE GAS MODELS



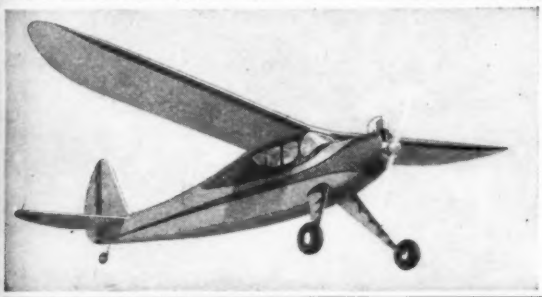


VALKYRIE

GAS TYPE RUBBER POWERED MODEL

Wingspan 24"
Length 15"
Weight 1¼ oz.
Flies ½ mile

Designed by Carl Goldberg, the indoor model plane expert, the Valkyrie is an exact duplicate in miniature of his highly successful streamlined gas model bearing the same name. This parasol model is easily built in four or five hours time. The dummy motor looks and sounds like the Brown Jr. which powered the original model. Complete kit with full size plans and instructions, postpaid only..... **$1.00**



"The Flea" Rubber Powered Model Airplane

Wingspan 36" Length 28" Weight 4 oz.

Those builders who have been prevented from owning a real gas job because of prohibitive cost will derive a great deal of pleasure in flying the "Flea." Besides having a ratchet device for imitating the sound of a gasoline engine, the model features movable control surfaces, shock proof gas model type landing gear, and a new style ball bearing propeller washer. A pair of M & M Pneumatic Rubber Wheels are supplied in the kit. **$1.95 POSTPAID**

Read what Jim Clark has to say about his "Flea":

Dear Sirs:
Your advertisement was all wrong about The Flea model flying a 1½ mile or 2,500 ft. because my Flea model flew for a distance of 10,000 ft. I had launched the model after using a winder and it climbed like an elevator nosing up steeply but without stalling for a single second.

I thought the model would never come down, but it did eventually and after much running, I managed to be on hand when it landed.

A perfect flight if there ever was one. My models from now on will always be Scientific Flyers. I am enclosing a photo of my Flea model on another flight it made. To date I have flown my Flea model over 50 times without any damage or repair except for new rubber.

A Scientific Customer
(Signed) James Clark.

BY POPULAR DEMAND

A NEW GAS TYPE RUBBER POWERED MODEL AIRPLANE

The "FIREFLY"

Wingspan 36" Length 28" Weight 4 ozs.

The kit is complete, including M & M pneumatic wheels with inflating tube; all formers printed on balsa; tru-pitch 10" balsa wood propeller; rubber lubricant; brown contest rubber; wire; washers; tissue; motor hooks; cement; and all necessary metal for building the ratchet motor-hum effect; full size detailed drawings with explicit instructions. A real value for only $1.95!!! Order your kit now!

Postpaid, including M & M Pneumatic rubber wheels

$1.95 POSTPAID

GUARANTEED SCIENTIFIC GAS MODEL SUPPLIES

BALSA WOOD
Strip Balsa
5 ft. Long

⅛x⅛	$.02
⅛x¼	.04
⅛x⅜	.06
⅛x½	.06
3/16 sq.	.04
3/16x¼	.07
3/16x½	.08
3/16x⅜	.09
¼x¼	.06
¼x⅜	.08
¼x½	.10
¼x⅝	.12
5/16 sq.	.08
⅜ sq.	.10
⅜x½	.12
⅜x⅝	.15
½ sq.	.12
½x⅝	.15

SHEET BALSA
5 ft. Long

1/32x2	$.10
1/32x3	.15
1/16x2	.12
1/16x3	.18
⅛x2	.15
⅛x3	.20
3/16x2	.18
3/16x3	.25
¼x2	.20
¼x3	.25
½x2	.25
½x3	.35

BASS WOOD
5 ft. Long

⅛ sq.	$.05
⅛x¼	.06
⅛x⅜	.07
3/16 sq.	.07
3/16x⅜	.09
¼x¼	.09
5/16 sq.	.12
⅜ sq.	.15
⅜x½	.20

SCIENTIFIC PNEUMATIC WHEELS

These wheels are absolutely puncture-proof. 3½" size. Capable of supporting Models weighing up to 20 lbs.

Per pair **$1.50**

TRU-PITCH GAS PROPS ONLY **75c** Each

13", 14", 15", 16" **$1.00**

De Luxe Gas Props

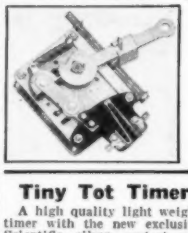
Finished with 8 coats of Buick Metallic Gray Auto Enamel, and hand polished to a hi-gloss. 13-14 in. Each now only **$1.75 P.P.**

NEW! SELF-STARTER

Cranks your model engine for you. No booster batteries needed. Simple, positive, safe! Press the button and your motor runs. **$3.00 postpaid.**

FREE GAS ENGINE COVER

This motor cover is something that all gas model fans have wanted. It is attached over the motor cylinder, and protects the ignition points, carburetor and other vital parts of the engine from exposure to dampness and dust. A real worthwhile present—cannot be purchased—given free by Scientific with all orders for supplies amounting to $1.00 or more. Only one to a customer because of limited quantity. Get yours today.



Robot Automatic Timer

This is by far the best timer on the market. Small in size and weighing only 1¼ oz., this device is adjustable for any length of time and to a fraction of a minute if necessary. Setting of a knob gives the desired time. 100% accuracy is guaranteed. See the Robot Automatic Timer at your dealer's or order direct.

Price ..... **$2.80** Postpaid

Tiny Tot Timer

A high quality light weight timer with the new exclusive Scientific silver contact attachment.

Complete **$1.95**
Silver contact attach..... **.50**

Landing Gear Brackets

This is the most practical method yet devised for joining the landing gear wires. No soldering, welding or binding is necessary—just insert the wires in the proper holes and tighten the screws. The brackets allow for adjustment of the gear in any position or angle. Complete set of two brackets with six set screws. Only **$.50.**

Storage Battery

Light weight, small size. Will last many years. Packed complete with bottle of distilled water, recharging bulb and battery mounting bracket. Complete **$2.50**

1¼", 1⅜", 1½", 1⅝"—pair 50c
1¾", 1⅞", 2⅛" 2½", 2⅝"—pair 60c
3½"—pair $2.75
4½"—pair 2.75
6"—pair 4.50

Use this coil for new pep and power in your engine. Each.... **$2.50**

HOOK UP WIRE

Oil, gas and waterproof. 5 ft. coil.....20c

MINIATURE KNIFE SWITCHES

2-pole switch ea.	.25
3-pole switch ea.	.35

1938 MODEL YEAR BOOK—BY ZAIC
$1.00 P.P.

MODEL BUILDERS' TOOL KIT

A 75c value for only ..... .50

TURNBUCKLES

Length ⅛" ea.	.20
4 for	.75
Length, 1", ea.	.25
4 for	.90

THE STREAMLINER

Wingspan 6 ft.; Weight (Less motor) 2¼ lbs.; Length 43"

An advanced gas model acclaimed nationally for performance. A really **complete** construction kit, postpaid or at dealer. Less motor and wheels. Complete kit with pair of 3½" pneumatic rubber wheels (val. $1.50) less motor **POSTPAID** **$4.95 $5.95**

HOW TO ORDER

Add 15c to orders up to $1.50. On orders over $1.50 add 10%. Orders amounting to $4.00 and over are sent postpaid. All kits and gas motors are sent postpaid. All orders shipped same day they are received.

DEALERS

Take advantage of the popularity of the Scientific line of models and supplies. If you do not already carry Scientific products, write today on your letterhead and get full information.

SCIENTIFIC MODEL AIRPLANE CO.

218-220 MA-10 Market Street *"GAS MODEL HEADQUARTERS"* **NEWARK, N. J.**

In England: Model Supply Stores, 17 Brazennose St., Manchester
In Australia: Swift Model Aircraft, 158 Adelaide St., Brisbane, Queensland
In Portugal: Ed Von Hafe, Rua Dr. Miguel Bombarda, 243, Porto
In Finland: O-Y Wiklund, Turku, Abo

How to Select Your Wing Sections

By GILBERT MacLEAN

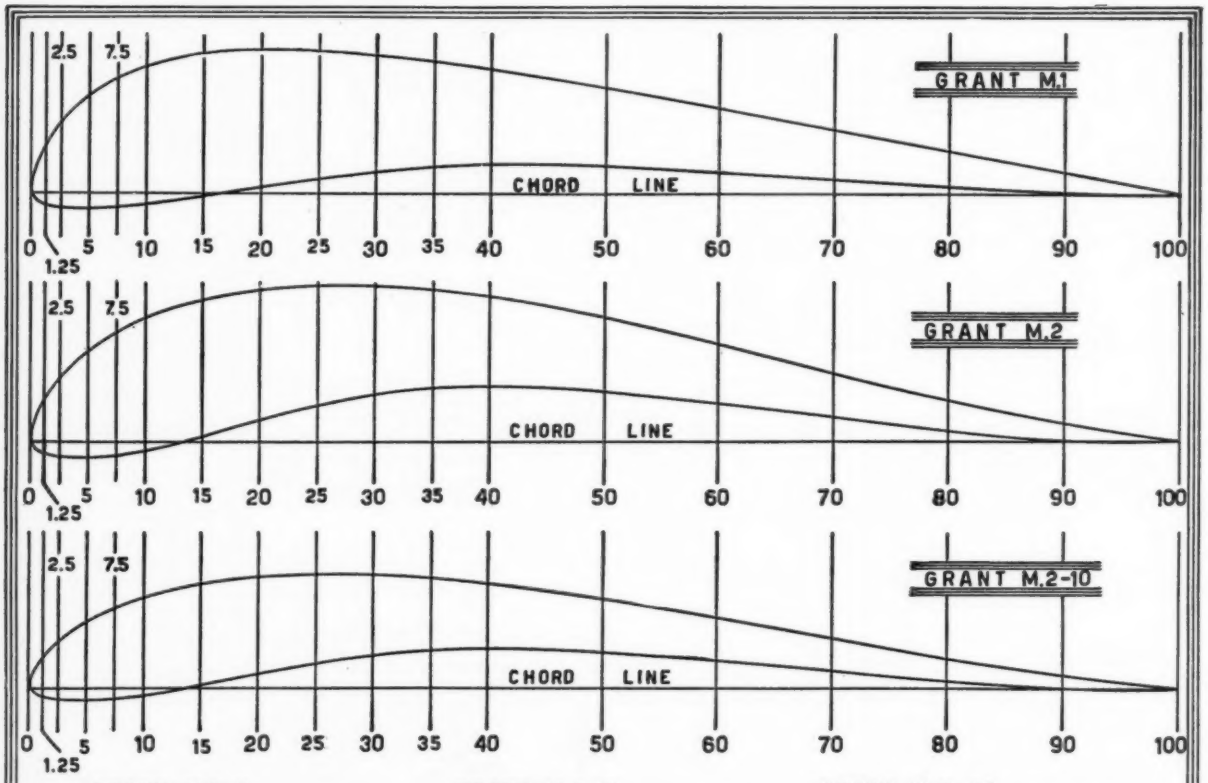
ONE of the most mysterious things about the airplane is the effect that the wing section has upon flight. This is due in many cases, to the fact that many designers and builders do not understand the effect upon the lift and drag of an airplane, that various wing section shapes will produce.

In order to choose a suitable wing section for your airplane, one must know: first, the type of flight he wishes his plane to make; and second, how to choose the wing section which will have the qualities necessary for such a flight. The profiles of many wing sections that are used on large planes are available and many model builders have made use of these. However, these sections are not always suitable for model work as they have been designed for the purpose of carrying heavy weights at high speed.

This briefly is the problem required in the case of large airplanes. Of course, low landing speed must be attained for large planes, also. These sections to be used on large planes must be designed so that they will fly slowly at very high angles of attack.

The problem for models is entirely different. The landing speed is unimportant. Efficiency at normal flight angles of from two to three degrees is very important, and primarily the section must lift considerable weight with high efficiency (high L/D) at a very slow speed.

The slower the model flies the more efficiently will it qualify as a duration airplane. In other words, the objective of the design of a model is duration. Duration is produced by two things: Rapid climb and excellent soaring ability. This leads us to the conclusion that the profile of a bird's



GRANT M.1-8

% CH'RD	UP'R C'B'R	L'W'R C'R
0.00	0.00	0.00
1.25	4.10	— 1.10
2.50	6.00	— 1.40
5.00	8.42	— 1.50
7.50	9.78	— 1.42
10.00	10.90	— 1.10
15.00	11.92	— 0.46
20.00	12.20	0.46
25.00	12.20	1.10
30.00	11.95	1.75
35.00	11.45	2.25
40.00	10.70	2.52
50.00	9.20	2.45
60.00	7.45	1.88
70.00	5.55	1.35
80.00	3.72	0.65
90.00	2.75	0.05
100.00	0.00	0.00

GRANT M.2-7

% CH'RD	UP'R C'B'R	L'W'R C'R
0.00	0.00	0.00
1.25	3.90	— 1.10
2.50	5.50	— 1.40
5.00	7.80	— 1.50
7.50	9.52	— 1.30
10.00	10.86	— 0.96
15.00	12.40	0.35
20.00	13.20	1.88
25.00	13.60	3.10
30.00	13.50	4.00
35.00	13.18	4.58
40.00	12.60	4.78
50.00	10.75	4.25
60.00	8.50	3.40
70.00	5.92	2.10
80.00	3.60	0.90
90.00	1.50	0.00
100.00	0.00	0.00

GRANT M.2-10

% CH'RD	UP'R C'B'R	L'W'R C'R
0.00	0.00	0.00
1.25	2.80	— 0.08
2.50	4.05	— 1.03
5.00	5.74	— 1.10
7.50	7.00	— 0.96
10.00	7.96	— 0.71
15.00	9.10	0.26
20.00	9.70	1.38
25.00	10.00	2.38
30.00	9.93	2.94
35.00	9.69	3.36
40.00	9.25	3.52
50.00	7.90	3.11
60.00	6.25	2.50
70.00	4.35	1.55
80.00	2.65	0.66
90.00	1.10	0.00
100.00	0.00	0.00

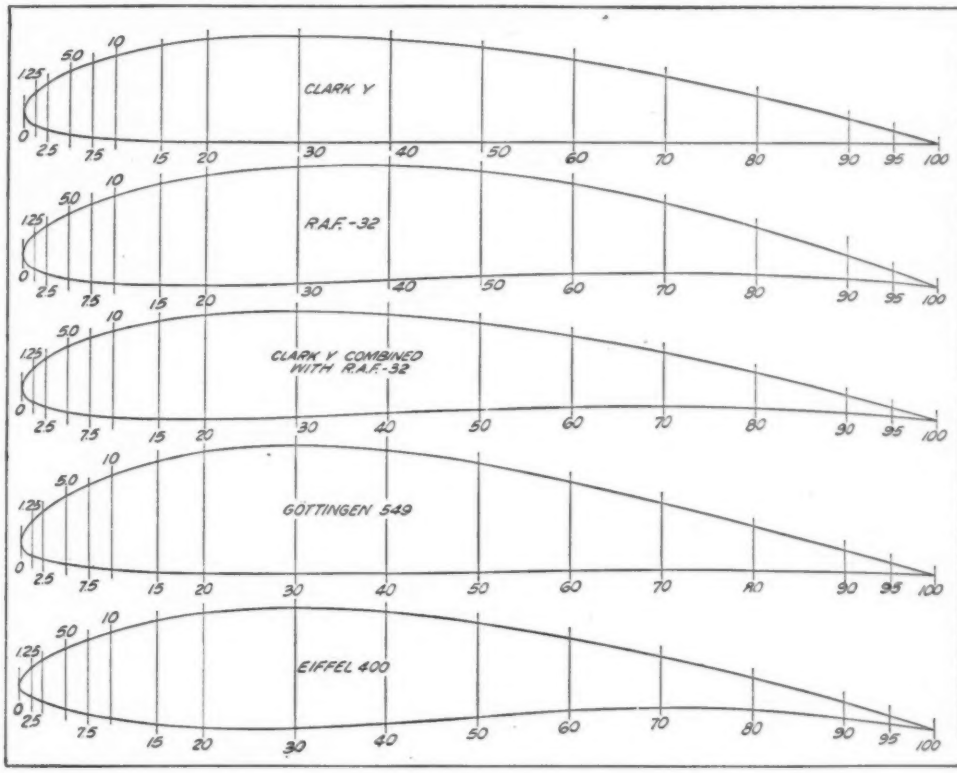
3 NEW EXPERIMENTAL AIRFOILS

DRAWN BY: GILBERT

wing surface is a better example of what our duration wing section should be than sections used on large airplanes.

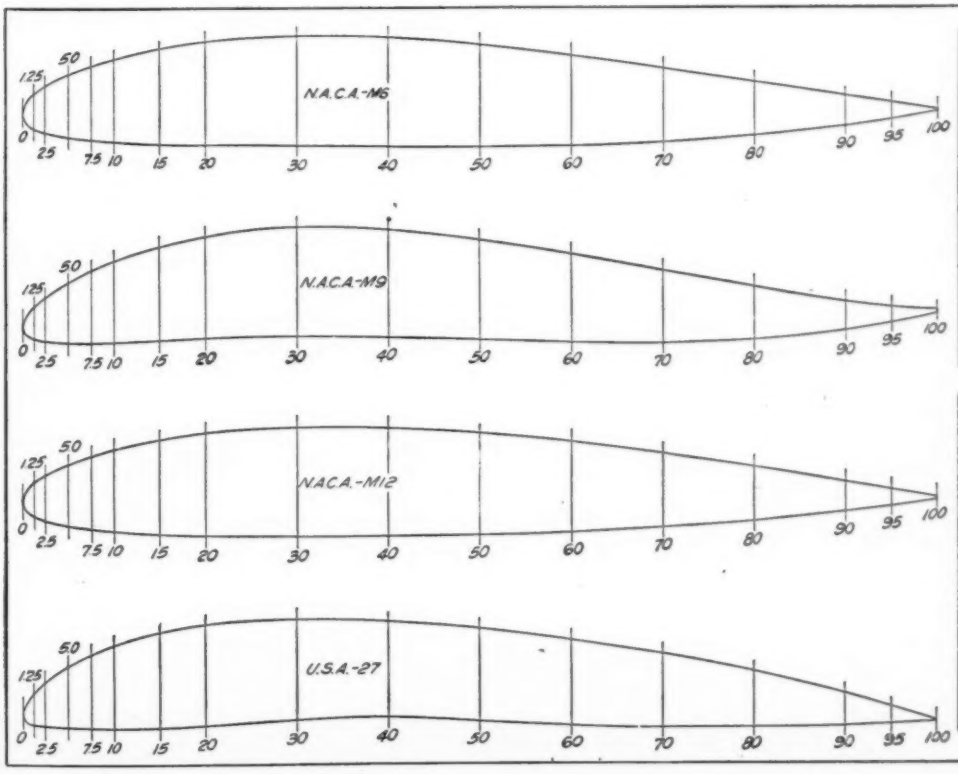
Many observations and a number of experiments have been made by the author along these lines. One of the important theories held by a number of model builders is that at very slow speeds the air breaks prematurely over the upper surface of normal airfoils. This effect apparently has not caused a great loss of efficiency of wing sections used on models at the present time. In the average case we would say that the effect is negligible. However,

(Continued on next page)



CLARK Y			R.A.F. 32		
%	UPR	LWR	%	UPR	LWR
0	360	360	0	342	342
125	538	186	125	556	196
25	643	142	25	652	150
50	783	091	50	784	088
75	879	059	75	883	050
10	956	039	10	972	030
15	1063	012	15	1102	008
20	1132	001	20	1192	000
30	1168	000	30	1208	030
40	1137	000	40	1310	070
50	1049	000	50	1246	110
60	913	000	60	1106	146
70	734	000	70	910	160
80	521	000	80	656	146
90	279	000	90	360	092
95	150	000	95	198	052
100	012	000	100	012	000

GOTTINGEN 549			EIFFEL 400		
%	UPR	LWR	%	UPR	LWR
0	345	345	0	480	480
125	570	195	125	663	339
25	680	160	25	748	285
50	845	110	50	877	203
75	965	075	75	979	141
10	1070	055	10	1050	100
15	1225	025	15	1185	042
20	1320	005	20	1250	010
30	1385	000	30	1310	010
40	1340	010	40	1260	060
50	1205	030	50	1160	130
60	1005	055	60	990	200
70	790	065	70	800	240
80	535	055	80	580	220
90	270	030	90	310	130
95	140	015	95	169	071
100	000	000	100	000	000



N.A.C.A.-M6			N.A.C.A.-M9		
%	UPR	LWR	%	UPR	LWR
0	000	000	0	181	181
125	197	-176	125	408	044
25	281	-220	25	514	015
50	403	-273	50	676	000
75	494	-303	75	803	005
10	571	-324	10	908	018
15	692	-347	15	1069	042
20	755	-362	20	1174	063
30	822	-379	30	1273	080
40	805	-390	40	1251	066
50	726	-394	50	1143	040
60	603	-382	60	983	009
70	458	-348	70	798	001
80	306	-283	80	611	032
90	155	-177	90	452	125
95	088	-108	95	394	203
100	026	-026	100	353	306

N.A.C.A.-M12			U.S.A. 27		
%	UPR	LWR	%	UPR	LWR
0	000	000	0	177	177
125	203	-165	125	380	050
25	286	-214	25	507	036
50	401	-272	50	694	019
75	489	-307	75	822	010
10	559	-331	10	919	002
15	661	-360	15	1050	010
20	730	-380	20	1137	036
30	795	-398	30	1197	093
40	786	-396	40	1169	114
50	725	-382	50	1086	075
60	627	-350	60	954	028
70	495	-300	70	808	006
80	350	-231	80	610	001
90	189	-137	90	369	012
95	107	-081	95	226	033
100	020	-020	100	067	065

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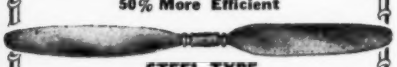

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How to Select Your Wing Sections

(Continued from previous page)

in order to have a section which will produce a breaking effect of the airstream over the upper surface, the Grant M-1 section was designed. In the case of this section the highest point of the curve is well forward, about twenty per cent from the leading edge. This creates an extremely steep surface at the nose of the airfoil, which has the effect of fairly bouncing the air up at a high rate of speed. This increase in speed tends to give the air the required velocity over the upper surface so that it will not break away from it and become turbulent. This section is purely experimental and its value, as yet, remains to be proved.

Sections M-2 and M-2-10 are developments of the idea that the "bird knows best." These sections are, as nearly as possible, exact profiles of birds' wings. Here we are throwing theory to the winds and taking examples of what nature has to offer. A number of sections of this type have been tested and have proved highly efficient on slow models in which slow speed is desired. These sections are recommended for rubber powered duration models.

Now let us look at some of the characteristics which influence the selection of a section for a model. First, suppose we consider the facts which have been learned about airfoils and their behavior, and see how they fit in theory with experimental results. The first thing to consider is that the higher the camber of a section, generally speaking, the more lift the section will have. We speak of upper camber when we refer to "camber" in this case. The upper camber causes most of the lift; in fact it generates about three times the amount of lift generated by the lower surface of the airfoil.

The highest-lift wing possible is one in which the upper surface has a high camber and the lower surface also is well cambered. Thus we see in the Grant M-2, a very high lift airfoil.

The camber of the M-2-10 is one-tenth the length of the chord and lower than the M-2. Thus the maximum lift of the M-2-10 is less than the M-2. Because of this it is a faster wing.

On page 35 are some sections used on large planes. Considering these we see that very few have high under cambers, and also in many cases, we see that the upper camber is not extremely high. In this respect the sections are not as suitable for slow speed, duration work as the M-2 sections just given. However, the best sections in this group, to use for this purpose, are the R.A.F.-32, Clark Y combination with the R.A.F.-32, Eiffel 400 and the U.S.A.-27. The Gottingen 549 may be considered a fairly slow section due to its high upper camber.

However, for slow speed, soaring work it is best to choose a section which has a cambered lower surface. This gives the airfoil floating qualities at slow speeds. Sections such as the Clark Y, N.A.C.A. M-6, N.A.C.A. M-12, are not suitable for slow speed duration work. Primarily they are fast sections with high efficiency, but with comparatively low maximum lift coefficients.

This brings us to the next consideration; that is, wing efficiency. This is, briefly, the amount of lift developed by a section in relation to the amount of drag it produces at any given speed. Primarily this is the "theme song" which prompts the designs of wing sections for large planes. All the sections shown, other than the Grant sections, have been designed with this idea. They give high efficiency but, generally speaking, high lift at slow speed is lacking.

The Clark Y is one of the most efficient sections ever developed. The L/D of this, at about six degrees, is about twenty-two. That is, the lift is twenty-two times the drag. The M-12 is a very efficient section. On the other hand it is very fast because of its positive camber on the lower surface, and low camber on the top surface. Any lower surface which has a positive camber that is bellied down rather than curved upward, denotes speed qualities rather than duration qualities.

One of the reasons why the lower surface of airfoils are cambered downward rather than upward is to reduce to a minimum the movement of the center of pressure on the wing. This makes the wing very stable but, as in nearly everything about the airplane which we must consider, this stability is obtained at the expense of some desired quality.

The M-12 is a typical example of a wing section which is extremely stable, very fast and efficient. However it lacks the quality of high lift at slow speed, and efficiency under this condition. The Clark Y is a section mid-way between the two extremes of high efficiency and low lift, and high lift with low speed.

The problem of every model designer is to use a wing section which has high lift at slow speed, yet which is highly efficient under these conditions. Wing sections such as the Grant M-2 and M-2-10 have not been used on large planes not because of their lack of efficiency, but rather because they are not conducive to high speed with efficiency. They have been designed primarily for models, and in these sections we believe that the model builder will find the wing which possesses all the qualities required for soaring, low speed flight.

Efficiency of these wings is induced alone because of the fact that at the nose the lower surface bellies downward and then sweeps gradually upward to the rear in a graceful curve. Bellying downward at the nose produces a smooth flow of air and allows it to stream upward and backward along the under surface without inducing any measure of drag. This high camber, on the other hand, produces a large amount of lift. At the trailing edge you will note that the under surface gradually turns upward to meet the upper surface. This allows the airstream to slip away from the trailing edge of the wing and join with the airstream flowing over the top of the wing in such a manner as to create little disturbance.

Again we refer to nature. When in flight the flexible tips of the birds' feathers curve upward, due to the pressure of the air upon them. If one observes the bird's wings when it is at rest, naturally this condition will not be noticed; as the tips of the feathers turn up only when pressure exists along the under surface of the wings.

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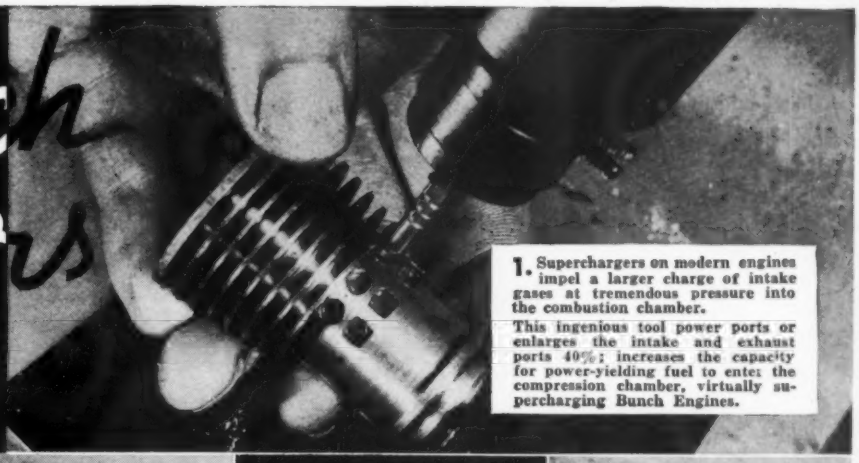

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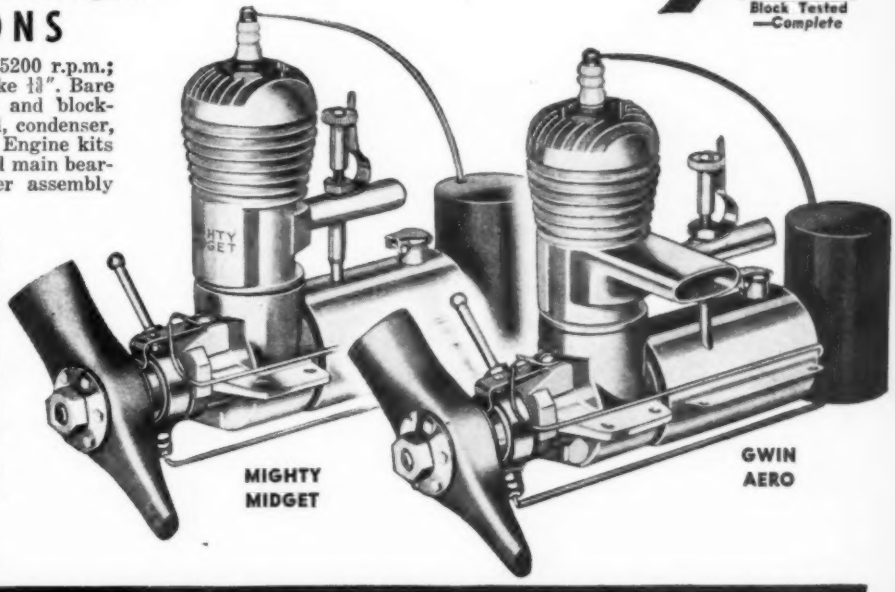

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Silk per square yard 50c

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Other features which enter the problem of wing design are structural. In our foregoing discussion structural necessities have not been considered. This is a very important point in the design of large planes and most wing sections are modified in order to create sufficient distance between the upper and lower surface so that a deep and strong rear spar may be used. You will note in the U.S.A.-27 section that at a point about sixty per cent from the leading edge the section is quite thick. The rear spar usually passes through the wing in about this position. The under surface has been bellied down so that a deep and strong rear spar may be used.

In gas models this consideration of strength is fairly important, as this type of model is quite heavy and fast, which produces stresses requiring strong spars. However in rubber models strength consideration is secondary to characteristics which produce efficiency. Thus in the Grant M-2 and M-2-10, the efficiency of the wing has not been destroyed by increasing the thickness of the section at the point through which the rear spar will pass. If these sections are used for rubber powered models sufficient strength can be produced by using a fairly small rear spar and by using a deep spar in the front with the nose of the section, top and bottom, covered with balsa so as to create a monospar effect. If the main front spar is placed at the twenty-five per cent point and the balsa covering of the nose is cemented to this spar, top and bottom, it alone will stand the bending and twisting stresses of the average rubber powered model. Any rear spar used under these conditions will serve as an additional strength member.

If any readers build and test these two sections, the Grant M-2 and M-2-10, we will appreciate it if they will write and tell us of the results obtained.

Build the Brewster Fighter Minute Model

(Continued from page 17)

for a navy ship can be used, that is, all silver except the top of the wing, which is yellow.

Landing Gear

The test model is shown with a duplication of the old Brewster style landing gear. The production model of the real ship has a much simpler arangement, consisting of a single strut from the fuselage, and the heavy fairing over addition al struts running up to the wing. Make the inner strut as shown on the plan, from a single piece of .028 wire cemented to bulkhead B as shown. Slip a piece of 1/16" aluminum tubing over the wire, then bend the axle and add the wheel. Cut the outer fairing from thin cardboard (a penny postcard will do) and cement it in place. Balsa may be used, but the cardboard allows the gear to move up and down freely to absorb landing shocks.

Propeller

Carve a propeller from a block of medium hard balsa 4-½"x7/16"x1-3/16", or use any low pitched prop of about that size that you have on hand.

Flying

Add as much detail as desired, cover the cockpit with thin celluloid, and the ship is ready to fly. Use two strands of 1/8" flat rubber with about an inch of slack. If the model is slightly nose-heavy, bend up the trailing edge of the stabilizer. If it is very nose-heavy, remove the cowl and hollow it out until the model balances at about the wing midpoint. If the model stalls, bend the trailing edge of the stabilizer down. Correct for spiral diving by applying opposite rudder. If necessary, warp the trailing edge of the inside wing down.

Our test model proved very fast and covered a great deal of ground in an average twenty second flight. The model is very rugged and can be flown outdoors with great success.

Original Design Contest

(Continued from page 27)

however, the design shown here has been worked out with the evident idea of reducing weight. The body part is small, the outriggers holding the hull being very much lighter than a large extended body used for this purpose. The motors are high, well up away from spray. The pilot has unobstructed vision.

The aerodynamics of the ship are unquestionable. The detail of the nacelle is carried out in a very clever manner to give support on the water, yet to reduce head resistance to a minimum. Actually it is merely a case of perfect streamlining. The tail surfaces are high, so there will be no possibility of coming into the wash from the body when it is landing or taking off from the water. The cantilever effect gives unquestioned efficiency. A feature that does not show in the picture is the retractable wing floats. These floats fold up into the wing so as to reduce head resistance when they are not in use.

The only criticism that might be made concerning this model is that we believe that the nose of the body is not long enough to prevent nosing over on rough water or possible bad landings. The distance from the nose to the first step is very short indeed. If in the design the nose is lengthened two or three feet more, much better water qualities will be produced in the actual ship. As shown in the picture the plane is liable to oscillate about the lateral axis when on the water, jumping along like a scared rabbit.

Mr. Weathers, therefore, receives this month's prize of $5.

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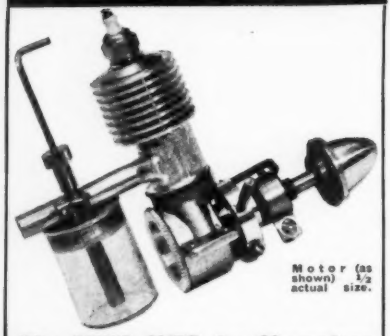

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New features in the Challenger include a new type motor mount and an instantly accessible battery box. Any ⅛ or ⅙ H.P. motor may be installed.

A few contents of the complete kit are: Full sized plans; mahogany finished hard wood propeller; large cans of cement, plain and colored dope; heavy duty inflatable airwheels; ignition equipment; all strip wood cut to correct size, ready cut ribs, etc.—$6.75. Minus airwheels—$5.50. Minus airwheels and liquids—$3.98. All kits prepaid in U.S.A.

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3 Is positive. No springs or balky parts.
4 Shaft is rigid on prop. Prop does not spin on shaft.
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Travis Multi-Flex Bearing with Free Wheeling Clutch **50c**

T.M.-F.B. without Free Wheeling Clutch **25c**

Prices apply to style for use on motor stick model or nose plug type for fuselage. Specify whether for motor stick or fuselage model.

TRAVIS MODEL AIRPLANE COMPANY

Colorado Springs, Colorado

The Hybrid Airplane Contest

(Continued from page 30)

ber issue were to be mailed to the office of MODEL AIRPLANE NEWS not later than midnight, September 19. Answers for this, the last set of plans appearing in the current issue, must be at the office of MODEL AIRPLANE NEWS, 551 Fifth Avenue, New York City, not later than midnight, November 2.

3. Each answer blank must bear your full name, address and age printed clearly in the space indicated. The contest will be judged on accuracy and neatness of presentation.

4. The judges will be Mr. Charles H. Grant, Mr. George C. Johnson and Nick Limber. The decision of the judges will be final. Duplicate awards will be made in case of ties.

5. All answers submitted become the property of MODEL AIRPLANE NEWS and will not be returned. The blanks on page 29 may be used to submit your answers or blanks similarly arranged.

6. The awards are as follows:

1st place	$10.00
2nd place	6.00
3rd place	4.00
4th place	3.00
5th place	2.00
6th place	1.00
7th place	1.00
8th place	1.00
9th place	1.00
10th place	1.00

Meet the Navy's Newest Fighter

(Continued from page 15)

both the ground and air. His vision is further enhanced by the inclusion of a window in the floor of the cabin directly between the pilot's legs. This belly-view window has heretofore been untried and much valuable information is expected to be gained in the effaciousness of such a design.

Complete flight and engine instruments are carried on a neatly constituted dash panel located high in the cockpit. Former fighting ships have stressed the placement of the instrument board low in the fuselage necessitating awkward pilot position for accurate readings. The XF2A-1 has placed these high before the pilot so that a single drop of the eyes still insures accuracy and speed in readings. The gun sight is installed above the instruments and projects through the shatter-proof glass windshield out along the forward part of the fuselage. It is of the telescopic, micro-ground viewfinder type and insures complete enlargements within the range of the guns.

Armament aboard the XF2A-1 includes two Browning MG-53 electrically-controlled 50 caliber machine guns firing forward through tunnels in the cowl. It is not generally known but nevertheless a fact that Brewster engineers have been working in close cooperation with those of the American Armament Company in the design of a 37 millimeter cannon suitable for aircraft installation. Possible installation of such a weapon on theXF2A-1 at a future date, probably one in each outer wing panel outside the arc of the propeller, would enhance the deadliness of this craft to a ghastly extent.

Immediately to the rear of the pilot's head is the emergency lift raft and accessories. This rather odd location may be examined by the suggestion of an emergency landing at sea. Should the ship crash or sink rapidly it appears obvious that this location would be the last to submerge, thereby affording the pilot ample time to assemble the raft and cast off before his plane disappeared beneath the waves. Inflation is by a small cylinder of compressed gas anchored along the inner surface of the cylinder. A complete "abandon ship" maneuver may be accomplished in thirty seconds.

The pilot is protected from the elements by a shatterproof glass sliding hatch which moves to the rear on metal tracks for entrance and exit. It may be locked in any of three positions according to the desire of the pilot. Possibility of injury to the crew in the case of a nose-over in landing or a minor crash has been forestalled with the design of a heavy triangle brace just to the rear and above his head. This structure is capable of supporting the weight of the entire ship on its back.

Tail units are of all-metal construction, movable surfaces being fabric covered for greater ease of movement and to lessen vibratory tendencies.

The tail wheel is completely retractable, actuating in unison with the main landing gear units on the same hydraulic system. In the rear-most section of the tail cone is the carrier-deck landing hook, which moves out and down for a quick arrestation after touching the deck. This particular device has been most carefully guarded by both Brewster and naval officials and promises to be of a startlingly revolutionary design.

Rudder and elevators are equipped with controllable "Flettner" trimming tabs for controlled stability according to the ship-loading conditions and various desired attitudes of flight.

Complete radio sending and receiving equipment has been installed, the aerial being supported fore, by a perpendicular metal mast, and aft by a small vertical bracket on the vertical stabilizer. Complete emergency rations and fresh water are also stored in a convenient compartment just under the life raft.

Detailed performance figures of the XFA2-1 have not been released as it is still very much under experimental status. However, preliminary performance specifications for the competition itself call for a ship capable of a top speed of 350 miles per hour, a cruising speed of 310 miles per hour, a ceiling of 33,000 feet, a cruising range of 650 miles and a landing speed of 60 miles per hour maximum.

Cruising range, according to the United States Naval Design Data, means the straight line distance a ship may travel and still return to its point of departure, or, i.e., the round trip distance neglecting windage a ship is capable of. In this case, the actual flying range of these fighters would be 1300 miles.

Enthusiastic reports from engineering officers at Anacostia assure us that the Brewster XF2A-1 has not only met these extremely rigorous specifications but has shown a performance actually in excess of that required.

ALL-AMERICAN . . .

Designed with rugged construction and all weighing at least 10 oz. per sq. ft. of wing area, every Berkeley-Design available at the time placed among the first ten place winners at the Detroit Nationals, finishing second, fifth, and ninth, outclassing all other commercial models entered. Although the rules were temporarily changed for this particular meet to only 8 oz. per sq. ft. of wing area, the performance of the lightweight floaters could not be compared to the well-built Berkeley-Designs. We extend our heartiest congratulations to the winners and our sincere thanks to every contestant who entered his Berkeley model in spite of the last minute rule change. You were truly All-American Sportsmen.

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The new CAVALIER-STANDARD

6-Ft. Wingspan—For 1/6 to 1/4 h.p. Motors

So many requests have been received for a smaller version of the famous "Custom-Cavalier" that we just had to introduce the "Cavalier-Standard." No model compares with it for its zippy climb. It even outclimbs the "Buccaneer-Standard." There is nothing like it anywhere. You can be the first in your neighborhood to fly one if you order now.

Kit is complete with full size plans, printed wood, and everything to build the model as illustrated, including colored dope. (Your choice of color.) Wheels and power plant are not included.

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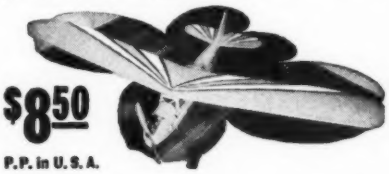
5½-Ft. Wingspan. For 1/6 to ¼ h.p.

Undisputed as the biggest prize winner in model meets throughout the country, this ship is winning new contests every month. The list of prize winning places could fill this page.

No model builder finds it hard to construct. Everything you desire in a small high-powered gas model. No kit at even several dollars more can compare with it for completeness. Kit includes full size plans, all wooden parts printed out, and three colors of dope (Your Choice). Complete kit less wheels and power plant $5.00 P.P. in U.S.A.



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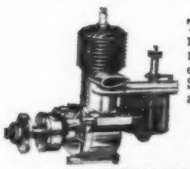

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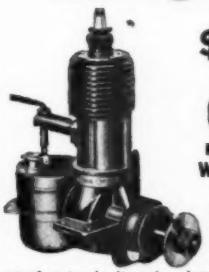

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1/16x2 20 for	17c	CLEARCEMENT		PARA RUBBER 225 ft. skeins.	
3/32x2 20 for	20c	1 oz. bot. dz.	40c	.045 sq.	30c
⅛x2 20 for	22c	2 oz. bot. dz.	65c	1/16 sq.	33c
¼x2 20 for	40c	1 pt. 40c 1 qt.	60c	⅛ flat	40c
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Such a ship, capable of a speed of 375 miles per hour and a rate of climb of 4,000 feet per minute, would put to shame any foreign fighters of a similar design, and give the United States Naval Air Service a ship unsurpassed in speed and fighting ability. The Brewster XF2A-1 has done that!

(Author's note: To those students of military aircraft design designation who have become puzzled over the assignment of the designation XF2A-1 to this later Brewster and wonder what happened to the first Brewster Fighter, if it existed, we wish to explain that the letter "A" formerly belonged to the General Aviation Manufacturing Company, or more familiarly to Anthony H. G. Fokker's design efforts in this country immediately following his tremendous success in Germany during the World War. His first and only naval fighting plane, an all-metal bi-plane powered by a Pratt & Whitney "Wasp" engine, was assigned the designation XFA-1. Following the subsequent disbandment of this group and the policy of the navy to award a particular designation to only one airplane design, this latest Brewster was, of necessity, designated XF2A-1. It is, however, as was previously stated, Brewster's initial attempt at fighting plane design.)

Build A Solid Scale Model Of The Brewester XF2A-1

A NAVY fighter can't be beat for neatness and trimness in model building, but when it's the very latest and fastest navy fighter on the military horizon, then you've got a REAL model in store for you. Such a ship is this Brewster XF2A-1, and such a model should be yours when you've studied the plans carefully and followed these instructions closely. So, let's go:

Fuselage

The fuselage is carved from a single block of balsa, size 6 1/2 x 1 1/4 x 1 1/4 inches.

Trace the side view of the plans onto the block and cut out with band-saw or small hand-saw. Eliminate the tail surfaces and cockpit enclosures until later. Remember to make the small cut in the bottom of the fuselage for the belly-view window. Now trace the top view of the plans on the block and cut along these lines. Make cardboard templates out of the fuselage cross-sections shown in the plans in this manner: trace the sections on cardboard, cut the sections straight through the middle vertically, which should leave you a "U" shape cut in the end of your cardboard. Now rough the fuselage to shape, taking care not to make too deep a gouge before measuring with the template at the positions marked on the plans. Sand the fuselage down carefully, then begin detail work.

Cut out the landing gear wells with a small brace and bit, using a 5/8" bit, or the nearest next size available. Cut the cooling gills around the fuselage and shape up the tail end where the carrier hook is stowed. A small bent pin may be made to move out of a recess hollowed out with a drill.

Mark on the fuselage the position of the wings and tail surfaces and paint the fuselage a brilliant silver or white, taking care not to paint over the wing and tail connections or they will not glue well. After putting on at least three coats (taking care to let each dry first) take a small brush and paint in the detail in black paint. The legend "U. S. Navy" is located just above and forward of the horizontal stabilizer. Rivet sealing lines and cowling details are drawn on with a ruler. The pilot's hatch is built up of stiff celluloid curved in a perfect semi-circle and painted over with black paint or ink to simulate the hatches.

Place a small cylinder of balsa, painted black, inside the cockpit cover for the emergency life raft. The sliding portion of the hatch may be made by cutting two grooves on either side of the fuselage, bending the celluloid at right angles at the bottom, and inserting into the grooves. It will then slide forward and aft. A small black cylinder of balsa is placed through a small hole in the windshield for the gun-sight, supported at the forward end up off the fuselage. The belly-view window is cut out, and two sheets of balsa, cut in the chords of a circle, are glued in. A sheet of cellophane is then glued over this framework.

Wings and Tail Surfaces

Wings and tail surfaces are cut from sheet balsa, the wings from a piece 4 1/4 x 1 3/4 x 3/8 inches. Lay out the top view of the wing on two identical sheets and cut on band-saw or hand-saw. Use rough sandpaper to sand to shape and give small dihedral to lower surface. Make templates of the wing sections as previously described and cut to shape. A template of the tip may be made to insure accuracy at this point. Us a smooth sandpaper to sand into finished surface. Cut small grooves for aileron hinge lines. Paint lower surface silver, upper surface orange, dividing at indicated position shown in front view drawing. Draw rivet seal lines along length of wing and place red, white, and blue stars in indicated position. The inner circle is red, the outer blue, the star itself, white. The letters "U.S." go on the under surface of the port wing; the letters "NAVY" on the starboard wing. Take great care not to let paint run onto the wing connecting surface at the end. Small wing-tip running lights may be glued on as indicated.

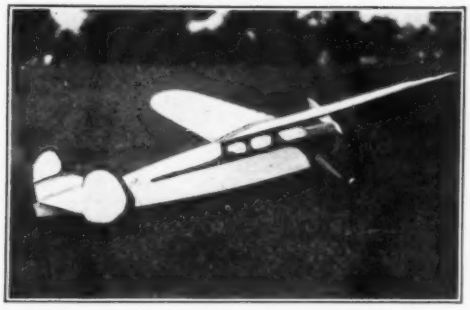
Tail surfaces are cut from sheet balsa, sanded to shape, and painted silver; the upper surface of the horizontal stabilizer, a brilliant orange. Cut grooves for the hinge lines and paint in rivet sealing lines with black paint.

Landing Gear and Propeller

The landing gear wheels should be purchased as a much more attractive model will result. Build up the gear with bamboo, following the side view shown in dotted lines, carefully. The upper, inner cross is made with white thread. The structure is painted silver, the wheels black as indicated. The outer strut is made of balsa and should conform quite closely to the corresponding leading edge of the wing into which it fits. Paint this portion of the wing black. The small piece next to the wheel is a hydraulic shock absorber cylinder.

Motor details have been ommitted to

Announcing.... THE *Alpha* "CORSAIR"



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Senior Model

5'8" wing span, weight 2½ lbs. complete with motors. Rugged and Super Stressed Construction. Built to N. A. A. rules. Suitable for any 1/5 h. p. motor. Kit has wheels, completely finished prop, 3 view plans, Landing gear wire, all wood and spare wood, cement, clear dope, and 2 large cans colored dope, wire parts and ignition supplies. Really Complete Kit. **$4.75 P.P.**

Junior Model

3'6" span, weight 16 oz. with any 5/8 bore motor. Has detachable wing and tail construction, and is a contest winner in every way. Kit has finished prop, wheels and all necessary parts. Climbs spectacularly and glides like a soarer. A model for those who want compactness and easy handling. **$3.00 P.P.**

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16" dia. (8, 10 or 12" pitch)	1.25

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3/16x3/16	8 for .25
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3/16x1	2 for .19
1/4x1/4	6 for .25
1/4x1/2	4 for .25
1/4x1	3 for .25
3/8x3/8	3 for .25
3/8x1/2	3 for .27
1/2x1	1 for .13
1x1	1 for .25

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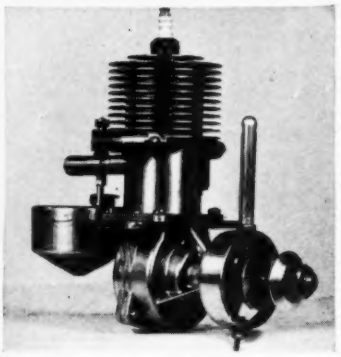

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FORSTER BROTHERS not alone build outstanding, powerful, prize-winning model airplane motors, but model motors for speed boats, air and water cooled as well. The FORSTER SUPER SPARK COIL contributes in a large way to easier starting and greater power. None is more efficient. It needs no boosters. Get one for your present motor and see the great difference. It is not so much the price you pay, but what you get for your money that counts in the end. Excuses never won contests. Get the facts. Write today for descriptive literature, sent upon receipt of 3c stamp.

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clarify the gun implacement and cowling details. Build the motor up with small sections of match sticks or balsa cylinder, glueing small pieces of bamboo on the forward surface to simulate push rods. Take care that the motor itself is constructed at least a quarter-inch back inside the hollowed out cowling or an amateurish appearance will result. The crank-case is made of a spherical piece of balsa and should project past the leading edge of the cowling. The propeller is made of pine and the plans should be followed carefully. All modelers know that the "prop" makes or ruins a model so take exceedingly fine care at this point.

The slinger ring is made of balsa painted a deep black. Carve out two small niches in the cowling and poke in two small balsa cylinders for the machine guns. Two small exhaust stacks should be glued in just behind the cowl as indicated in the plans. The prop is painted silver, engine black, and the landing gear as described above.

Final Assembly

The wings have no diheral so glue them straight onto the fuselage using plenty of ambroid. Same is true of the tail surfaces. The pilot's hatch should come next, the landing gear following, and the propeller last. Take care that these surfaces are at exact right angles or the entire appearance of the model will be spoiled. Build up the streamlined effects at joints with wood cement or a mixture of flour and ambroid. Radio mast should follow, made of a piece of bamboo tapered as much as possible. Black thread glued to the two connections on mast and rudder serves as the radio aerial. The prop may be connected with a single pin but make sure that the head is painted black. Move the pin around in the prop until the hole is large enough for free spinning. A small washer may be inserted between the prop and the crankcase but take care that the pin is inserted into the latter only once; otherwise the prop will fall out at the least movement. Tail wheel is built-up of scrap balsa and should be of the skid, non-movable type as it is too small to insert a movable wheel. Study the cover for minute details and paint them on as required. Your model is then complete and ready for the mantle. We can hear those friends now, saying in unison: "Boy, that's snazzy!" It's the only phrase to describe the sleekness and beauty of the Brewster XF2A-1 Fighter!

Frontiers of Aviation

(Continued from page 19)

can's requirements.

Specifications of the airplane follow:

Span—194 ft.
Overall height—31 ft.
Length—102½ ft.
Fuel capacity—8450 gallons.
Payload—25,000 lb.
High speed at 20,000 ft.—276 m.p.h.
Range at 20,000'—5,000 miles.
Service ceiling—30,000 ft.
Landing speed—78 m.p.h.
Gross weight—168,000 lb.

The wing loading comes to almost 45 lb. per square foot! Four 2,300 horsepower Allison engines are set in the wing between the spars with extension shafts running to the propellers. The engines are liquid cooled. Thirty-six of the 100 passengers will be housed in the wing in two and four place cabins. A dining room will seat eighteen at one time.

The outward appearance of the Consolidated plane is different from what might be expected. Being something on the order of a flying wing, the stubby hull with its three passenger decks is very compactly situated under the wing with the tail on a long single boom high above the water line. This boom contains a good portion of the passenger accommodations, cuts down the structural weight of the craft and perhaps reduces the all-important parasite drag considerably.

In the meantime Consolidated advertises a 24 passenger commercial flyingboat for Atlantic service that may be available immediately. It is a direct development of their navy patrol bomber, which the company claims is the fastest four-engined flyingboat in the world today. Well that is enough for Pan American's activities for the present. We have shown our hand and now will the cards correctly foretell the future?

Curtiss project, which we can proudly say was first made public by us, is supposed to do 237 miles per hour at 20,000 feet on two 1,600 horsepower engines. Beside the thirty passengers carried, there will be a crew of four. For sleeper service accommodations will be provided for twenty people with a goodly supply of cargo. For utmost speed it will be a mid-wing airplane with a sleek sealed cabin for high altitudes. Gross weight is about 36,000 pounds.

THE NEW AIRSTREAM DENNYMITE WITH THE PROVEN DENNY JR. THIS FINE COMBINATION WILL BE A WINNER FOR YOU!

Airstream DENNYMITE DE LUXE

The best you can buy and the most for your money! Standard on the DeLuxe Airstream (above) are aluminum outside exhaust, dural mounts for fire-wall, bakelite-cased superior coil, and outside-control choke. Saves $2 over buying these DeLuxe "extras" separate.

$17.85

STANDARD

For less money than others, you get full streamlining and a host of other Denny superiorities. Includes hot-spark coil and condenser. Does not include DeLuxe mounting brackets, spring choke, down-draft exhaust.

$15.85

ENGINE UNIT ONLY

(Less coil and condenser)

There are no "seconds" in the Denny line! This economy purchase is identical to the higher priced standard model except that condenser and coil are not included. Especially planned for replacement installation to avoid wasteful duplication of parts.

$13.85

The DENNY JR. STANDARD

SPECIFICATIONS: Finished spun metal cowl. Finished propeller. Cut-out ribs. Streamline, pneumatic airwheels with inflator. *Plenty* of selected bass and balsa wood. Oversupplies of finest Dennycloth fabric covering, genuine Swedish steel landing gear wire, Berryloid Dope and Cement, screws, nuts, bolts, etc. Haskalite and metal for fire wall, motor mount, etc. Not a single extra to buy. (Plans alone, $1.50, refundable on later purchase of complete kit.) Wing span, 6 feet, 1 inch; 45 inches over all length; weight 3 pounds.

Complete kit, less motor, $9.50

DE LUXE

THE DE LUXE DENNY, JR.: Same design, with all metal parts, fire wall, motor mounts, landing gear, brackets, plates, etc., completely finished, and with 4½-inch airwheels. Formerly $15, now **$12.50.**

WHEN PURCHASED IN COMBINATIONS WE CAN OFFER YOU—

The Standard Denny Jr. with any motor, price of Kit $6.95

The DeLuxe Denny Jr. with any motor, price of Kit $9.65

Of course—we still have the genuine, success-tested Round Cylinder Head Dennymite, complete, ready to fly, with dural mounts. Now reduced to $14.50.

See Your Nearest Dealer— if necessary order by mail.

REGINALD DENNY INDUSTRIES, INC.
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Hollywood, California

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(California Customers only add 3% Sales Tax)

However, the very latest news in big airplane design is that Boeing is going to build a navy patrol bomber of about 60,000 lb. Something else along the navy line that has already weathered a good bit of testing is the Stearman observation scout job which we first mentioned to you several months ago. Its most important feature is the individually mounted airfoil flaps as used on the German Junkers. The plane will probably be used for catapult work. Sorry, but the navy does not wish us to reveal more of the details on the airplane at this time.

The giant six-engined rebuilt Latécoère 523 is a much better looking airplane now that it has a well designed bow up forward and does away with that former "canal boat" effect. While on the subject of French airplanes, we see a new Bregnet twin-engined multi-seat attack plane which has all the essence of speed. A small airplane, it has two Twin Row P & W engines of American make. It is a rather small airplane with double rudders and should be able to go places, and it really has good looks.

The Caudron C-710 fighter developed from the racer hauls two large 20 m/m cannons in the wing. Top speed is 286 m.p.h. with a V-12 450 hp. engine.

At this time of the year one's main interest seems to be in air racing now that the National Air Races present themselves. Air racing, the dangerous occupation that it is, always has plenty of backing . . . newcomers entering the game where the old timers left off. How many of the names of those who flew racing planes and have now passed on do you remember? There was Speed Holman, Doug Davis, Freddy Lund, Lowell Bayles, Roy Minor, Lee Miles, Roy Liggett, Russell Boardman, Florence Kligensmith, Ruth Barron, Gus Gotch, Captain Page, Rudy Kling, Jim Granger, Frank Haines, Jimmie Wedell, Walter Wedell, Johnny Worthern, Z. D. Granville, and Cecil Smith, as the more important racing personages of recent years; most of whom died while in a racing ship.

Here is a list of new names that may become prominent at the 1938 National Air Races. . . . Lee Williams, Bud Pearson, Bob Bean, Tom Floyd and the relatively new Tony le Vier and Russ Chambers. Tony tried to get into air racing with Ralph Bushey's rebuilt job a few years ago and then with the little Flagg Special with no success, but he finally broke the jinx at the Oakland meet with a Schoenfeldt-Rider Special. Incidentally it was this same plane, flown by the late Gus Gotch last year, which we stated would beat a Folkerts if its engine was functioning perfectly, and we stirred up a lot of talk by mentioning that. The irony of it is though that Gus Gotch switched to a Folkerts and was killed when it reportedly fell apart, and the Schoenfeldt-Rider was finally whipped into shape and did 253.46 m.p.h. in the 100 mile free for all race. But watch the Folkerts and the Riders battle it out this year. Clayton Folkerts has produced a new "super" job and should do well, barring accidents.

Bud Pearson has designed Lee Williams'

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BROWN, JR. MOTOR "D" NOW $10

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⅛ 8 for 10c
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3/32 8 for 10c
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1/16 sq. x12, 36, 5c
1/16x¼x15, dz. 10c

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5c per oz.; Large bottle, 8c; ½ pt. 30c; 1 pt. 45c

COLORED DOPE
6c per oz.; Large bottle 10c.

CLEARCEMENT
5c per oz.; Large bottle, 8c; ½ pt. 35c; 1 pt. 55c

PROPELLERS

Balsa	Paul-O-	
Mash. Cut		Wina
5" 4c		10c
6" 5c		15c
7" 6c		20c
8" 7c		25c
9" 8c		30c
10" 8c		35c
12" 10c		45c
14" 14c		
15" 15c		60c

RUBBER
.045 ..... 25 ft. 5c
1/16 sq., 15 ft. 5c
⅛ flat ....15 ft. 5c
Skein 50c
3/16 .....10 ft. 5c

RUBBER LUBRICANT
Large bottle....10c

5-FOOT BALSA
⅛x⅛ 30 for 20c
⅛x3/16 12 for 20c
⅛x¼ 10 for 20c
3/16x3/16 8 for 20c
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¼x⅛ 3 for 20c
⅜x⅜ 1 for 8c
½x½ 2 for 20c
⅜x¼ 1 for 2c
For 5' lengths add 25c pckg. charge. Specify whether you wish balsa for rubber-powered or gas models.
Double Balsa prices for Spruce, Basswood, or Pine.

PNEUMATIC AIR WHEELS
3½" ..... pair 1.50

SPRING STEEL WIRE
1/16 dia. 5 ft. .12
3/32 dia. 5 ft. .15
⅛ dia. 5 ft. .25

DURALANGLES
⅛x⅛ per ft. .15
¼x¼ per ft. .22

BRASS ANGLES
¼x¼ ft. 25

STREAMLINED ALUM. TUBING
¼x¼ ft. 15c
5/16x5/32 ft. 16c
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SPARKCOIL 1.50

GAS FUNNEL with strainer .30

FLIGHT TIMER 50 Sec. ..... .50
0 Sec. to 1M. 2.00

DURALTUBING
¼ dia. ft. .14
5/16 dia. ft. .20

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A. Large bottle clear cement and 60 1/16 x1/16x18 balsa
B. 2 pr. 1 7/8" Birch Wheels
C. 3 sheets silver tissue
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WOND. WATER SPRAYER 15c

WHEELS per pr.

Brch	Blsa	Celu
½	.01	.03
¾	.02	.04 .05
1	.03	.05 .07
1⅜	.04	.08 .10
1⅞	.07	.10 .16
3	.15	.15 .30

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.0004x5x11½ 2 sheets 3c
.005 in. 6x6 5c
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THRUST BEARINGS, dz.
Sm. 10c; lge. 15c

PROP BLOCKS
½x¾x5 6—5c
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⅝x1x7 4—5c
⅝x1x8 3—5c
¾x1¼x10 3c ea.
¾x1¼x12 3c ea.
1x1½x12 4c ea.
1x1½x15 7c ea.

SANDPAPER
Doz. sheets 5c

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1/16.....4 for 1c

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1x2x1 ..... 1c
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TISSUE, AA
All col., doz. 19c
Silver .....ea. 5c
Superfine, wh. 5c

ALUM. TUBING
1/16, 3/32, ⅛ ft. 7c
3/16 or ¼, ft. 10c

WIRE
6-8-10-12-14
2 ft. 1c

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mid-wing ship, and powered with a curtiss conqueror it should do well with only a twenty-four foot wing to tote. Tom Floyd is another designer who has come forth with a new plane for Bob Bean; while another young but veteran race pilot, Clarence McArthur, has finally made the small Delgado racer show speed. Flying over a 100 kilometer speed course the plane did 207.027 m.p.h. to break the world record for that type of small racer.

Paul Mantz took delivery of his Lockheed Orion racer that he entered in the Bendix a few months ago, and almost cracked it up on landing when the wheels refused to come down properly.

Dave Elmendorph is likely to be back in the racing business this year, and of course Earl Ortman, Roscoe Turner, Frank Fuller, Ray Moore, Roger Don Rae, Art Chester (with new ship), Marion McKeen (with new ship), S. J. Wittman (with new ships) and others are expected to be on hand this year.

On Lockheed's side of the fence we have been hearing many stories about another sub-stratosphere airplane. Apparently the company engineers are not being "sissies" about the venture either, for two 2,300 horsepower Allison engines will power what is expected to be an attack-bomber. With all that power the wing loading made possible by Fowler flaps, the "smallness" of an attack-bomber, and the idea of flying at high altitudes will produce speeds well in the category of 400 m.p.h. Mind you, we just heard all this.

Now that the army has tested two-bladed counter-rotating propellers, the new Curtiss three-bladed props will be used next. Test work has been conducted with a Curtiss pursuit plane for some time, but the experiments are still in the preliminary stage. As we pointed out before, the development of the propeller will be rapid in the next few years to meet the progress of the high horsepower engines. An adoptation of the English Covic Marine Deisel engine may be used for aircraft in the near future. Jack Northrop, the noted designer, is heading the development and is working in conjunction with Menasco on the project. The engine is said to be of the flat opposed type and would make a snug fit in the wing of an airplane. The high horsepower output that may be obtained from these Deisel engines should be of deep concern to the propeller manufacturer.

Captain Ashley McKinley has been successful with tests using inflated rubber floats for light seaplanes. As far as size and shape are concerned, they are very much like the conventional float but offer smoother lines and their shock absorbing quality is outstanding. The next step Captain McKinley should take is to make them collapsible when in the air—that would really be cutting down resistance. In Russia an all-rubber glider was designed which could be carried around, blown up, and flown by one man. It would be very bewildering to the pilot though if the glider went through a deflating period while in the air.

Other "rubber" news is that the Poles are building the world's largest balloon that will soon try for the altitude record and perhaps get 70 or 80 thousand feet closer to some of our nearest planets. Much more progress than that will be needed before we reach the planets however as they are about six trillion miles away . . . don't you think? When one thinks that the ultimum of progress in the air has been reached, they are far wrong. There is still a long way to go—yes—six trillion miles. A certain man in Pasadena, California, has spent a good part of his life designing a helicopter that will capture the skies. It is now nearing completion with two sets of rotors, each with ten, eight-foot blades, propelled by a small Hisso engine. The propellers are variable pitch and all-metal. The workmanship has been good, and tests are to be conducted in the near future. The designer claims it will go straight up, straight down, forwards or backwards AT THE WILL OF THE PILOT. One of his backers had claimed that it will be able to hover over large forest fires and drop tons of water on them but we claim that the first experimental model now being completed will not get off the ground. However, we have not forgotten how a certain rather crude looking Wittman Special put some very super-super racing planes to shame; so we will just look on when this new helicopter makes its first attempts and tell you more about it later. It is a big thing, and who knows, there may be some surprises in store for us.

The hydromatic "quick-feathering" propeller has just been released for use throughout the world. (See picture on page 18.) There has been a need in certain types of airplanes for stopping the rotation of engines which may have failed in such a way as to render their continued operation dangerous. If the pitch angles of the propeller are rapidly increased to about eighty-seven degrees at the three-quarter radius point, the rotation of the engine is stopped almost instantly and the resistance of the idle propeller is reduced to a minimum. The practice of adjusting the angles of a propeller to this position where the chord of the blades is nearly parallel to the line of flight is called "feathering." The difference in ceiling of a twin-engined airplane with one propeller feathered, compared to the case of one propeller braked, may be as much as 2000 feet

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More Power! Easy To Start! Special New Features!

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Bore 21/32" Stroke 22/32"
Weight of Bare Motor 3½ ounces
Total Weight, Motor, Coil, Gas, 7½ ounces
Ready to Run—Less Prop
Speed Range 500 to 12,000 R. P. M.
With M & M Special Designed Prop
STATIC THRUST 20 OUNCES

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M & M Special Designed Prop. $1.00 Extra Postpaid. M & M Special 2-4 volt coil designed to operate M & M motors on 2 pen-cells. Will also operate all larger motors more efficiently. Price $3.00 postpaid.

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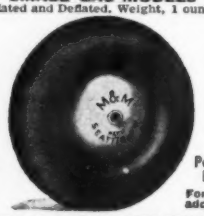

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3½" & 4½" Gas wheels—weight 2½ and 3 oz. per pair.
Now only $2.75 per pair, postpaid
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SIZES 1¼—1⅜—1½—1⅝"—PRICE $0.50 Per Pair, Postpaid.
SIZES 1⅞—2—2¼—2½—2⅝—2¾—2⅞"—and Special Designed DoNut Wheels. Size 1¾"—PRICE $0.60 PER PAIR, POSTPAID. For Air Mail Add 11c.
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under certain conditions; so that the feathering procedure shows a material improvement in performance, where one engine must be stopped. A number of airline operators have found the disposition of idle engines of great importance especially in connection with long range operations, and the feathering feature enables them to solve a serious problem.

The Physics Of the Airplane

(Continued from page 13)

subjected to what we term accelerations which are physically discomforting. There are two kinds of inertia. One kind involves the tendency of bodies to keep in a straight line unless acted upon by some external displacing force. The other kind of inertia has to do with bodies moving in a circular path. In the first instance, the inertia forces are proportional to the mass. In the latter instance, the distribution of the material of the mass and centrifugal and centripetal force are involved. In executing a steeply banked turn in airplane racing both kinds of inertia are momentarily experienced by the airplane.

Aircraft do not have large masses because the structure is fundamentally a space framework covered with fabric or else a metal shell with the major bulk of the material disposed far away from the geometrical axis of the whole structure. Therefore the momentum of an airplane is small, compared to other objects. However, the glider has the least momentum of heavier-than-aircraft and that is one reason why gliders tend to stall quickly. This deficiency in momentum of aircraft contributes to rapid stalling in event of motor failure unless an attitude of gliding is immediately assumed.

Momentum is defined as the product of mass multiplied by the velocity or

Momentum = mass × velocity

For example, if the weight of an airplane is 3,000 pounds and its velocity is 200 feet per second, what is its momentum?

Momentum = 3,000 × 200 = 600,000 ft. lbs. per second.

If the drag at that velocity is 300 pounds, what counter force is acting to slow down this airplane?

Counterforce = 300 × 200 = 60,000 ft. lbs. per second.

The second Newtonian Law of Motion deals with the subject of acceleration. This is continually the case when an airplane is undertaking a take-off prior to gaining altitude. To permit the airplane to take off, a constant acceleration per second must be applied in the direction to which the force is acting. In this case, the force is equivalent to the thrust force of the airplane in overcoming the drag. This acceleration force must overcome the drag because when the condition of normal flight speed is reached, the drag is equal to the thrust force.

It is logical to assume that the thrust overcomes the drag. Upon investigation however, the thrust and drag must be equal to each other at all air speeds. The student may question this statement but since forward thrust causes the drag, a greater expenditure of thrust force would cause a constant degree of acceleration. This is not in line with aerodynamic theory because at the take-off, the thrust force exerted by the propeller is effective because of the practically zero value of the drag at the instant of take-off. The function of the thrust, therefore, is to overcome the inertia of the airplane and the airplane gathers speed as it rolls over the ground before rising into the air. Once the acceleration produces enough speed for the airplane to rise in the air, the thrust and drag forces approach an equality of balance and the airplane flies along at normal speed. Acceleration ceases at the point of take-off into the air. See Figure 1.

Another good example involving acceleration is the use of higher power engines in airplanes. If some airplane uses 200 H.P. to fly at maximum speed, the addition of an engine of the same weight and dimensions of 300 H.P. will not mean a phenomenal increase in the speed. The added horsepower, however, will increase the climb and permit the airplane to fly at a lower angle of attack for the wing because the lift must equal the weight. The reduction in the drag will permit the speed to be appreciably raised.

Newton's Third Law of Motion encompasses the whole subject of mechanics. We use this Law when we speak of the reaction at the end of a beam, or the reaction of the wings generating a lift force to the air, or the reaction force on the chassis during a landing or a take-off operation. In taking off, the wheels of the airplane chassis push backward on the runway. Therefore the runway exerts a

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In another state-wide meet for all comers and all sizes of motors, the MADEWELL MITE took 1st, 4th, and 5th places.

It's a consistent winner . . . establishing a new standard of power, efficiency, and easy handling in the midget motor class.

The MADEWELL MITE is not a toy, but a precision-built finely engineered fully tested miniature motor. Bore, 9/16"; stroke, 9/16"; weight, bare 4 oz.; complete flying weight with propeller and 2 penlight cells, 8 oz.

Built for ships with 3 to 4 foot wing spread, and boy! how it sends them into the air!

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$17.50

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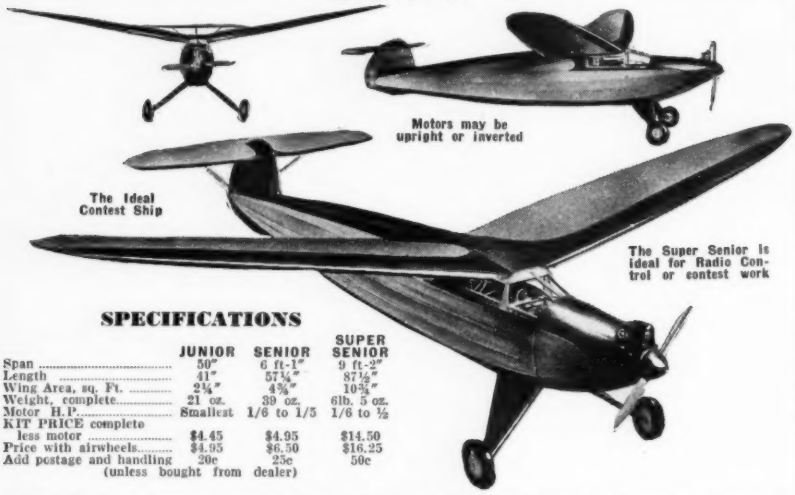

SPECIFICATIONS

	JUNIOR	SENIOR	SUPER SENIOR
Span	50"	6 ft-1"	9 ft-2"
Length	41"	57½"	87½"
Wing Area, sq. Ft.	2¼"	4⅝"	10⅝"
Weight, complete	21 oz.	39 oz.	6lb. 5 oz.
Motor H.P.	Smallest	1/6 to 1/5	1/6 to ½
KIT PRICE complete less motor	$4.45	$4.95	$14.50
Price with airwheels	$4.95	$6.50	$16.25
Add postage and handling (unless bought from dealer)	20c	25c	50c

EASIER TO FLY—Special (only on Korff Kits) slow stalling wing tips (NACA 6412 airfoil)—Approx. 8 oz./sq. ft. wing loading—Low center of lateral area in line with center of gravity—high line of thrust.
MORE EFFICIENT—Fuselage of elliptical cross-section—expertly streamlined—elliptical planform wing—NACA 4512 airfoil (soaring section)—Low drag motor cowl—Special "T" section tail surfaces eliminates "blanketing effects"
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KITS ARE COMPLETE—Cutout and notched ribs, wing tips, and formers;—turned balsa spinner for propeller;—all strip and sheet balsa cut to size and of finest quality;—plenty of material for battery box, motor mount, and other details;—landing gear and tail skid wire;—wheels;—celluloid for windshield;—toggle switch;—wiring;—hardware;—bamboo paper;—cement;—banana oil;—clear and colored dopes;—Easy to understand, full size drawings, clearly illustrated.
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Every year HEATHE starts the season with a BANG! Incomparable products at Tremendous Savings. See for yourself and compare.

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- 3½" Air Wheels, regular $1.50, only **$1.**
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Wood can be had in Spruce, Bass or Balsa at the same price as those listed below.

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3/16x3/16 ..... .04
3/16x⅛ ..... .07
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¼x⅛ ..... .05
¼x⅛ ..... .08
¼x1 ..... .10
⅜x⅜ ..... .09
½x1 ..... .18

SHEET BALSA 36" Lengths
1/16x2 ..... .04
3/32x2 ..... .05
⅛x2 ..... .05
¼x2 ..... .09
for 3" stock, double 2" Price.

CEMENT
4 oz. ..... .15
8 oz. ..... .35
1 pt. ..... .60

Dope, Paper Adhesive, Colored Dope same prices as cement.

BAMBOO PAPER
24"x36", 1 sheet ..... .05

SPECIAL JAP SILK
A strong, light 1 l k imported specially for gas models.
Grade A, 1 yd. .40

HARDWOOD PROPS FOR GAS MODELS
12" or 14" ea. .90
15" or 16" ea. 1.15

SPRING STEEL WIRE
1/16 dia. 5 ft. .12
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DURALANGLES
½x½ per ft. .15
⅝x⅝ per ft. .22

SPARK PLUGS
Brown Jr. Plugs
A needle point plug for engines. Recommended for baby motors especially.
Each ..... .65

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Extra small—wt. 1/3 oz.
Per set of 4 .25

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Special gas model condensers.
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forward resistance on the wheels which is equal to the take-off force.

In mechanics it is a common theorem that if one force acts forward, an equal and opposite force must act backward. The generation of the lift by the wings of an airplane displace the air rearward and downward. The reaction must be equal to the lift force in all cases. Another case is the application of the braking power applied to the landing gear by means of hydraulic brakes. The brake drums must absorb all of the forward rolling momentum minus the frictional force. Thus if the total energy in foot pounds of the rolling airplane amounts to 50,000 ft. pounds, the brakes must react with an equal amount minus the friction contributed by the runway and the axle bearings. From this it can be understood that the friction load per square inch of the braked drum area runs to a high figure. However, over a period of several seconds or so, this is not as great as may be assumed because of the time element entering into the equation. See Fig. 2.

Definition of Words
Article 3
The Laws of Motion and the Airplane

Stress Analysis: A mathematical investigation of the air loads, the static loads and the dynamic loads that are applied to the structural members of an airplane. The investigation covers the strength and the load factors which are necessary to meet a certain structural specification.

Gravitational: The phenomenon which transpires when two material bodies which are unrestrained in their movements will be accelerated toward each other.

Mass: A quantity of matter.

Function: The natural or proper characteristic action of a force, body, mathematical quantity etc.

Induced Drag: That portion of the wing drag which is directly resulting from the generation of lift by an airfoil.

Acceleration: The rate of change of velocity.

Thrust: The effort produced by a propeller.

Drag: The component parallel to the relative wind of the total air force on an aircraft or airfoil.

Mechanics: That study of physical science that deals with the forces acting on bodies.

Reaction: A force which is equal and opposite to the force of the action producing it.

Designing Your Gas Model Props

(Continued from page 21)

From this it may be seen that the pitch speed of a propeller must be proportional to the minimum flying speed of the plane on which it is mounted, at any given angle of incidence of the plane's wing. This means that at constant engine R.P.M.'s, the *pitch* of the propeller must correspond with, and is proportional to, this minimum flying speed. Thus the amount of pitch that any propeller should have is governed by this speed. This is the key to selecting the most efficient propeller for any particular plane.

(The proper amount of pitch to use with various minimum plane flying speeds is shown at the upper edge of the graph appearing on page 21, a slip of 33 1/3% and an engine speed of 4000 R.P.M. being assumed.)

It is obvious therefore that the second important step in propeller design is to determine the minimum flying speed of the plane upon which the propeller is to be mounted. From this information a propeller with the correct amount of pitch may be selected. Finally the proper values for *propeller diameter* and *blade width* may be chosen, for any given pitch and engine power at 4000 R.P.M.

If the propeller is to turn at a different rate of speed, say 5000 R.P.M., its characteristics first should be determined for a velocity of 4000 R.P.M. Then by a simple calculation, to be explained later, the correct values of pitch diameter and blade area may be determined for a velocity of 5000 R.P.M.

In the past the determination of the minimum flying speed of any plane has been an involved problem, one in which the lift coefficients of the wing of the plane have had to be known. Such coefficients have not been available, in many cases, to the model designer. If the designer elected to draw up his own wing section he would be unable to calculate the exact lift of the wing by means of existing formulas, as the value of the lift coefficient could not be determined without extensive and expensive wind tunnel tests. This is one reason why the designers' choice of wing sections has been confined to those in common use, the lift coefficients of which were known.

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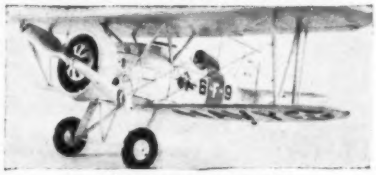

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However, in this series of articles, a formula has been developed which gives the lift characteristics of any airfoil, to an approximate degree, without the necessity of knowing the value of the lift coefficient derived from tunnel tests. The coefficient used is determined from the heights of the upper and lower cambers of the wing. This coefficient will be called the Camber Factor in these articles and will be designated by F_R. Actually this factor is a measure of the lifting effectiveness of the wing section used. The formula by means of which it may be calculated is as follows:

$$F_R = \left(\frac{3H_u - H_B}{4C}\right)$$

In the formula: F_R = the camber factor; H_u = the maximum height of the upper surface of the airfoil above the chord line which *passes through the leading and trailing edges of the wing;* H_B = the height of the lower surface of the airfoil above the chord line; if it is below the chord line it becomes negative in the formula, as $(-H_B)$; C = the length of the wing chord, or the distance from the leading edge to the trailing edge of the wing.

For instance, if you wish to determine F_R for the Grant X8 wing section, (shown on page 30, September 1937 issue of MODEL AIRPLANE NEWS) you proceed as follows: First, select the value of the chord. This is divided into ten equal units, so (C) in the formula will be (10). Now look at the table of camber ordinates in the table for the (X8) section, at the right of page 30, September 1937 issue. The greatest ordinate is 10.53% of the chord. Thus the actual measured value in terms of the units of distance into which the chord is divided is 1.053 units, as the chord is equal to ten units. Therefore the value of (H_U) is 1.053.

The maximum height of the lower camber is (—0.53) of the chord, so the value of H_B is (—0.053).

Now substituting these values in the formula, we have:

$$F_R = \left[\frac{3(1.053) + (-0.053)}{4(10)}\right]:$$

solving;—

$$F_R = \left(\frac{3.159 - 0.053}{40}\right) = \left(\frac{3.106}{40}\right),$$

or $F_R = 0.0776$.

This value has no actual significance except as a coefficient to be used; a formula showing the lift characteristics of a wing or for indicating the lifting effectiveness of a wing due to its camber. It is used in the graph on page 21 in this latter respect, in which it is shown at the left-hand edge.

In one of the first articles of this series a formula for the lift of a wing was given, in which this camber factor was used. It is:

$$L = \left[0.002(F_R)AV^2\left(\frac{3+1}{6}\right)\right.$$

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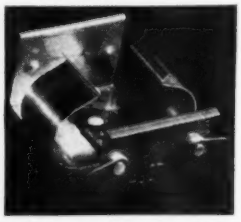

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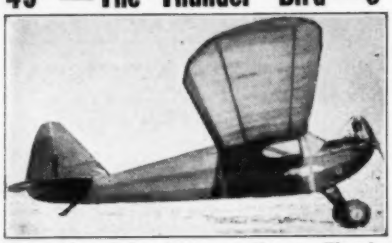

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In the formula: L = the lift of the wing in ounces; A = the wing area in square inches; V = the velocity in miles per hour; I = the angle of incidence of the wing (angle of the wing chord with the line of thrust), and F_R is the camber factor.

However, in the designing of the propeller for a gas model we are interested in determining the velocity of the plane, not the lift. The velocity may be calculated by means of this formula merely by rearranging the terms. When this is done, (W), representing the weight of the plane in ounces, is substituted for the symbol (L) representing lift, for we are interested in the weight of the plane rather than the lift. In this case the weight equals the lift, as the formula refers to models in level flight.

Therefore the formula may be written:

$$V = \sqrt{\frac{W}{0.002(F_R)A}\left(\frac{3+I}{6}\right)}.$$

In the formula (A) represents wing area in square inches. When it is multiplied by (144) it designates area in square feet. Making this change and simplifying we have a convenient formula for the speed of a plane in level flight. It is as follows:

$$V = \sqrt{\frac{W\ (3+I)}{1.728(F_R)A}}.$$

By determining the camber factor of any wing and substituting it in the formula above, the velocity of the plane in level flight using such a wing may be calculated. As an example let us suppose that the velocity of a gas model using the Grant X8 section must be determined. The angle of incidence (I) is to be three degrees; the weight is fifty-six ounces and the wing area is five square feet. When these values are inserted in the formula we have:

$$V = \sqrt{\frac{56(3+3)}{1.728(0.0776)(5)}},$$

$$V = \sqrt{\frac{336.0}{0.671}} = \sqrt{501},$$

or V = 22.4 miles per hour, the minimum speed of the plane in level flight.

As stated in preceding paragraphs, in order to determine the pitch of a propeller it is essential to know this minimum level flight velocity of the plane on which the prop is to be mounted. Thus, by means of the formula given above, the plane's velocity has been determined without the necessity of knowing the values of the lift coefficient of the wing. Now it is a simple matter to calculate the correct pitch of the propeller to be used on the plane just taken as an example.

A simple formula for the propeller pitch in terms of the plane velocity just calculated, with a slip of 33 1/3% and the propeller turning at 4000 R.P.M., is as follows:

$$P = (0.4)\ V$$

Substituting the correct value of (V) in the formula, we have:

$$P = (0.4)22.4 = 8.96 \text{ inches.}$$

Thus the pitch of the propeller should be about nine inches.

Determining the Speed and Pitch by Means of the Graph

A comparatively simple method of determining the speed of the plane and the pitch of the propeller is made possible by means of the graph at the bottom of page 21. Those who dislike working with formulas may use this method.

You will note that at the left side of the graph, camber factors are shown. These are qualified as "Low," "Medium" and "High." Wings with low cambers will fall within the limits indicated by "Low;" medium cambers within the "Medium" limits, etc.

It is always more accurate to calculate the camber factor by very close estimates, which may be made by determining the height of the upper curve of the section above the chord line and figuring its value relative to the chord length.

For instance, the height of the Clark Y upper surface above the chord line is (0.0875) of the chord. This may be determined by measurement. Three-fourths of this figure or (0.0674) will be the approximate camber factor. The lower surface is slightly below the chord line at its center, so actually the camber factor is a little less than this figure, or about (0.0625). This camber factor lies in the upper range of the "low" catagory of sections. Extremely high-cambered sections are those whose thickness above the chord line is about (0.16) of the chord. The camber factor for such a section is about (0.12). The Grant X has a camber factor of about (0.09).

At the lower edge of the graph various wing loadings are indicated in ounces per square foot. If your plane weighs fifty ounces and has five square feet of wing area, the wing loading would be: 50/5=10 ounces per square foot.

Now in order to find the speed of your plane and the pitch its propeller should have, proceed as follows:

First determine the camber factor of the wing. Let us suppose the wing is the Grant X, the section used on the well-known KG model. The camber factor of this section is about (0.09). Locate this camber factor listed at the left of the graph and note the horizontal line leading to the right from it. Now figure the wing loading of the plane. Suppose it is ten ounces per square foot. Note the vertical line leading upward from (10) at the bottom of the graph. Next

find the point where these two lines intersect.

The next step is to determine the position of this point relative to the *diagonal lines*. You will see that it is about 0.6 the distance from line (19) at the top of the graph to line (20), towards line (20). Therefore the speed of the plane will be (19.6) miles per hour. The pitch of the propeller may be read from the horizontal column marked "Pitch," above the "Speed" column. The difference between the pitch at nineteen miles per hour and twenty miles per hour is (0.4). Therefore the pitch is $(7.6)+(0.6\times0.4)=(7.6+0.24)=7.84$ inches. Thus the propeller should have a pitch of 7.84 inches. This is approximate as the camber factor was not figured exactly by the formula in the first place. However it is very close to the results obtained by means of the camber factor formula, which will give values of about (20) miles per hour and (8) inches pitch. The values given by the graph are for a wing angle of incidence of three degrees.

In the next installment a method will be given for determining the speed and pitch values at various other wing incidence angles. Also there will be a complete explanation of how to choose the correct diameter and blade width for the pitch to be used. Don't miss the important conclusions determined in the next issue.

Build the Mid-Wing Sportster

(Continued from page 11)

this part, a little instruction will come in handy.

Cut off two pieces, each 1-7/8" long, from a two-inch-wide sheet balsa. If the wood is not the type which bends easily, soak it in water and pin it around the front of the body in such a way that the joining points are at the top and the bottom. Wait until dry and cement to the body. Do not try to join them as yet. Take former No. 2 and fit it in the front. Since the nose is tapered toward the front (see side view) the two-inch sheet should just make it around former No. 2. The small wedge-like opening left on top and bottom can be filled up with pieces of balsa of the same shape.

Now the one piece landing gear wire is bent and cautiously forced through the body. It is bound to tear the wood around the hole a little but a 5/16" diameter cardboard washer on each side, slipped over the wire and glued to the outside of the body, will cover up the tear. The wire is cemented several times on the inside of the body.

Streamline the balsa landing gear struts and glue them to the wire all the way up to a point 1/8" from the body and no further, to allow free movement. After the balsa "doughnut" wheels are slipped on the axle a drop of cement at the end of the wire will keep them from falling off.

The simple cabin is built up last. The nose plug should be made in two pieces. First the rectangular plug is fitted into the nose and glued to a block of balsa. Then the outside part is carved down to the right shape. Use large washers with bushings to fit for the nose and prop bearings.

The sketch of the free-wheeling should be studied with the magazine held in normal position, contrary to the other parts on the same page.

Wings and Tail

The wings are built in two separate panels. (Right wing is shown on plan). All ribs are cut from 1/16" sheet balsa except the one next to the body, which is 1/8" thick. A slight slant is required on this rib for correct dihedral angle. The leading and trailing edges are cut to shape and all the ribs are glued in. To finish the framework add the 1/16" square spar and sheet balsa tip. Cover top and bottom with Japanese tissue and shrink with water. Do not give more than one coat of banana oil when dry.

The whole tail assembly is made of 1/32" sheet balsa. The front part of the elevator should be made of quarter-grained stock. A straight-grained strip 9/16" wide joined on will allow a little adjustment if necessary.

Balance the completed fuselage on a knife edge and mark the center of gravity. Now glue the wings on the body with the center of the chord matching the C.G. The leading edge is set 1/8" higher than

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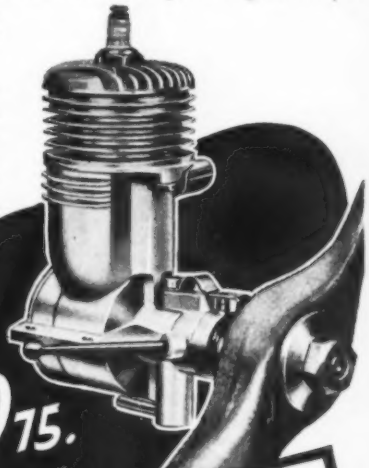

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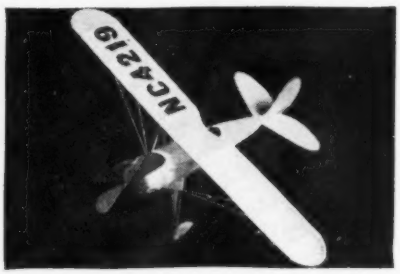

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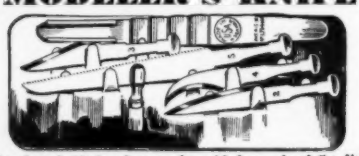
MODELER'S KNIFE



The above knife has 3 razor sharp blades made of Swedish tempered and polished spring steel and 1 Sawblade for model makers. Comes in handy box with special holder for the blades all fit to the same handle. (The ideal gift for all modelmakers.) 94c in U. S. Foreign 14c extra. We have 14 styles of blades for arts & crafts, schools, students and sportsmen. A well-made knife. The blades do not break.

NILS SEAHOLM 139 Kingsbridge Rd., Dept. MA Mt. Vernon, N. Y.

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WITH ANY OHLSSON MOTOR

1/7 h.p. Ohlsson only $16.50

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FREE TIMER, ANY TYPE OR SIZE WITH EITHER MOTOR

BROWN MOTORS always in stock

Model D	$10.00	Model C	$17.00
Model M	15.00	Model B	21.50

Mighty Midget Upright Assm'd	$ 9.50 kit		$7.85
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We recently secured an unusually large quantity of highest quality colored dope, made to U.S. specifications. Rather than move these dopes to our new location we are offering them at closeout prices. Take advantage of them.

We have in stock only the following colors:

Insignia Blue Gloss Black Lemon Yellow
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All shipments made f.o.b. Baltimore.

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the trailing edge for proper incidence.

Flying

Make up a nineteen inch long loop of rubber and drop it over the rear hook with the aid of a string weighted at one end. Glide the model several times to make sure that it has no diving tendency. A slight warp at the rear of the elevator should check any such trouble. Next, a few take-offs are recommended, with about one hundred winds in the motor. In case the ship stalls, off-set the rudder gradually to the right, to produce a sharper circle. And look out when she is adjusted properly, for she travels high and far.

Around The World In Ninety-one Hours

(Continued from page 9)

when the take-off was made turned into a heavy downpour, and it was necessary to take the ship up to thirteen thousand feet in order to get out of the storm conditions. The ship flew at this height most of the 1500 miles to the Soviet capital. This increased the problem of navigation. The rain made it impossible to see the ground and impossible to see the sky. Thus it was impossible to make "shootings," which necessitated getting up to a height above the squall in order to check the course. The instruments in the plane were not in any way affected by the rain. Apparently from radio contact with ground stations, everyone seemed to believe that the ship had suffered damage to her landing gear in the take-off. This was untrue since nothing was wrong with the plane's undercarriage. The bouncing which took place while the plane was taking off at LeBourget evidently made it appear as though the wheel had been damaged during the procedure.

Aside from the rain and a little rough air nothing eventful occurred on this second lap. The fliers were constantly over land and naturally were all a little tired, so they didn't waste much time during their rest periods to look at the various European cities as they passed over. It wouldn't have done much good anyway since they were above the clouds. They worked shifts and during rest periods lay down on the canvas mat which had been thrown on the floor of the plane. The eating program was something different, however. Like youngsters who don't believe in meals, they just grabbed a snack whenever the opportunity offered. The snack, however, was mostly canned goods, cookies or a sandwich. Milk was the most popular, however, and it was consumed in large quantities by all members of the crew.

Hughes let the automatic pilot do most of the flying on this second lap. This instrument is mounted on the instrument board and was one of the outstanding features of the plane. Its function is a very intricate operation. An "air pick-off" from two stabilizing gyroscopes actuates a hydraulic system which operates the controls. Thus the plane is constantly under almost perfect control, since the various air currents which are necessary to perfect flight are the very fundamentals which control the plane. There was little doubt about the success of the automatic pilot since the mechanical robot kept the plane on her true course and Hughes brought her safely to earth at Moscow; just seven hours and forty-eight minutes after she had left the field at LeBourget.

Omsk Lies Ahead

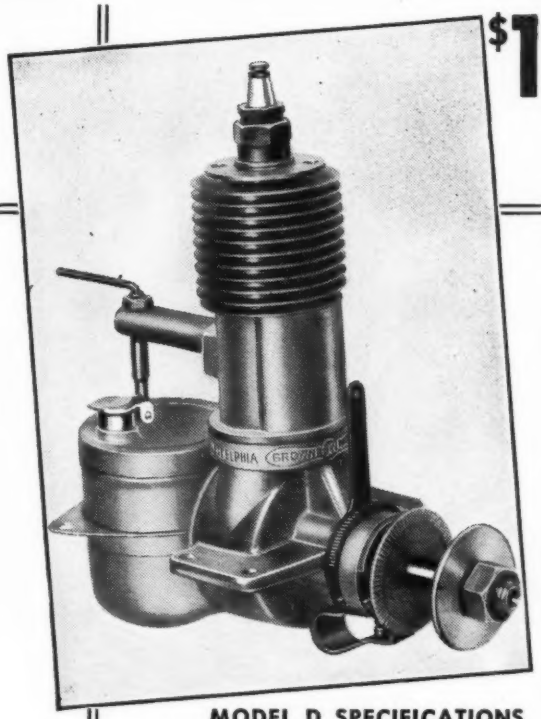
Mechanics rushed forward to the plane after it came to rest and began refueling. There were several members of the Russian Embassy staff who had gathered at the field for the arrival. Like those at Paris, they showed the fliers every courtesy.

There were several Russian type planes lined up on the field. They were large planes and resembled makes which the fliers had been more accustomed to four or five years ago. It caused considerable surprise among the Hughes' crew to see the Russians regarding these ships as "miracle" planes. All of the field attendants were equally surprised at the silver-winged monoplane from America, as most of them had never seen a similar ship and naturally the Lockheed held the spotlight.

The fliers spent little time conversing with those on the field since they were anxious to get into the air again. Finally, after two hours work, they were ready to depart. It was 4:30 A.M. New York time.

Up to this point Hughes had closely followed the course which Wiley Post had used on his round-the-world flight in 1933. However, when he lifted the ship into the air at Moscow he headed her toward Omsk, an important railway station on the Trans-Siberian Railway which is about 350 miles south of Novtsibirsk, where Wiley Post landed on the third lap of his flight. It was necessary to change the course, since Russian officials did not want foreigners entering their boundary except at certain points.

The air was less rough on this part of the trip than it had been from Paris to



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Model D

complete with coil and condenser—ready to fly!

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THE BROWN JUNIOR MOTORS COIL. Full strength spark at low speeds for easy starting. Waterproof, oil-proof, gas-proof. Specially designed and precision built.

MODEL D SPECIFICATIONS

Bore, 7/8". Stroke, 1". Weight (bare) 6½ oz. ½ h.p. R.P.M. 1200 to 10,000. Height 4¾" (including spark plug). "Z" metal counterbalanced crank-shaft. Connecting rod of forged aluminum alloy.

Block-tested before shipping and guaranteed against defective workmanship or materials.

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MODEL B: Special *steel* cylinder and *steel* piston retain compression and power. Chrome-molybdenum crank-shaft, practically shock-proof. $21.50 complete. MODEL C: Light weight combined with durability at the medium price of $17.00 complete. MODEL M (MARINE): With the speed and stamina characteristic of Brown motors for model planes. $15.00 complete.

JUNIOR MOTORS CORPORATION

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Moscow. Hughes let the "automatic" again do most of the work since the flying was over comparatively smooth country and there would be no mountains encountered until the next lap from Omsk to Yakutsk. So far Connors and Thurlow had had little trouble with the navigation. But poor Stoddard, he was in for it!

As the chief radio engineer, Stoddard did most of the communicating with the ground stations and he hadn't had much trouble up to now. There had been broken English which crackled into the receiver from French stations, an occasional German phrase had come through; but he had managed to decipher these with little trouble. But when it came to Russian—that got him. The only Russian word he was sure of was *Vodka* and that doesn't help much when you're two miles above the earth, trying to find your way across Siberia!

However, things weren't too bad, and Stoddard did remarkably well. The Russians have to be given credit, too, because it was just as hard for them to understand English. Both managed to get along somehow—fliers got a big kick out of the "trying to understand" business.

The radio communications on the flight helped greatly. There was no radio beam, but the constant ground contact enabled the fliers to keep informed as to weather conditions ahead of them and thus prepared them for what was to come. Ground stations also helped in informing the pilot how to land at the various airports scheduled for his stops.

It was twelve noon on Tuesday when the ship landed at Omsk. The fliers were 6,696 miles from New York, almost at the half-way point on the proposed 14,709 mile flight. Forty-two hours and forty minutes had elapsed since the plane had left Floyd Bennett Airport!

Last Stop in Siberia

So this was Omsk! The central part of Siberia. Here was the stopping point for caravans which wend their way across the desolate wastes of ice and snow. For days, sometimes weeks, men travel on foot from other parts of this barren land with the hope and prayer that they will reach this city of Omsk to obtain food supplies. It is the last outpost before going into one of the most desolate sections of country on earth, Northern Siberia.

Omsk had little to offer. There were no runways on the field; just hard grassy ground, but Hughes had little trouble in making the landing. There came to mind, however, the thought of the take-off. It might be necessary to cut short the load of gasoline. That would mean coming down sooner than had been planned and it meant finding another place to stop since Yakutsk was 2,158 miles away—the second longest lap on the flight so far. This was one of the problems which faced the fliers in Northern Siberia. It had been raining in Omsk for several days, and only by flying at high altitudes had they managed to escape the storms on the flight from the Russian capital. The rain had made the field soggy and in landing the wheels had a tendency to dig in deep, thus creating the fear for the take-off.

The Russian field attendants took some time in refueling the ship. The gasoline was taken from fifty gallon drums and pumped by hand into the plane. There were several men working pumps from the drums into one feed-line, which carried the gasoline into the plane. This was a much different procedure than that which the fliers were accustomed to in America, where they refueled from large gas tanks which carried hundreds of gallons of gasoline and were equipped with automatic pumps which made the refueling a quick procedure.

It was cold in this city of Omsk, making the work of refueling all the more troublesome. Strange, however, the fliers claim they didn't notice the cold in the air, but on the ground it was a bitter cold with the rain making it all the worse. It was a wet, damp, cold—the kind that would make you want to bundle up and not get out. They spent almost four hours here and didn't get off the ground until 4:27 in the afternoon.

As expected the ship seemed to cling to the earth before she got into the air. There were no obstacles at the end of the field as in New York and Paris, but even so the field had an ending and it seemed the ship wasn't going to make it. There was little bouncing which meant the mud was holding the wheels. The

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The following are replaced with new parts, or rebuilt where needed: main bearing, crankshaft, crankcase, piston, con rod and wrist pin. Tank and carburetor rebuilt or new. Also new coil where needed.

Block-tested and set in first-class running condition, these engines are packed and shipped immediately. You must send in all engine parts, including tank and coil, regardless of condition, or include the factory list price of missing parts.

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For $6.50 any gas motor, regardless of make or condition, exchanged for a rebuilt Mighty-Midget. All engines are eligible for this exchange.

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☐ Rush me 1 new Tom Thumb Engine, I enclose $7.50.

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spectators watched breathlessly. Hughes had the plane's tail up almost before he gave her the gun and there was plenty of mud tossed into the air before the ship finally got off the ground.

If you took half the Atlantic and covered it with a sheet you'd have a pretty good idea of how Siberia looks from the air. Except for a black spot here and there this piece of Asia is as covered with snow as Santa Claus' face is with whiskers. There was a great mass of nothingness below and the fliers were glad they didn't have to make a forced landing because there was no place to land.

The plane acted perfectly. There was hardly the slightest indication that the plane was in the air. The roar of the two motors was a steady hum to their ears; a hum which sounded sweeter than any music could ever sound. If one of them had failed it would have been just too bad, but they had the same steady purr which was theirs when Hughes pulled back on the throttle at Floyd Bennett and they never once faltered.

Five travelers touring the globe, were these five fliers, and they were flying over the most dangerous country in the world. Here was a good answer to the question —Is flying safe?

It would have been extremely dangerous down there even on foot. Only an occasional house was visible and these were few and far between. One could easily have become lost and it was terribly cold down there. To take a car across this vast no man's land would have been suicide—no car could have made it. There were no trains as the fliers were far to the north of the Siberian railroads. Yet their plane was eating up the miles, riding along smoothly and carrying them above all this straight to their objective. Safety? They thought so.

The 2100 miles to Yakutsk took a little over ten hours and the plane landed in Yakutsk about 3:08 A.M., New York time, on Wednesday. And speaking of places to land, this last Siberian stop was the prize of them all. Again there were no runways, but the field was even worse than that at Omsk. There were only a handful of field attendants there to meet the fliers and no one could speak English.

Stoddard had just said, "See, how much fun it is trying to make these boys understand," when a young girl in the crowd came forward and offered her "hello" in perfect English. This was the best greeting of all to the fliers. With the young lady acting as an interpreter, they managed to tell the Russians they wanted gasoline for the ship, something to drink and eat while they waited for the refueling. With the approach of dawn, however, they were off again and the ship fairly leaped into the air. Maybe she too was anxious to get back home. This lap was to carry the fliers across the last stretch of Siberia, thence over the Bering Straits to Fairbanks, Alaska, the first territorial possession of Uncle Sam's which they had touched on their entire flight.

The flight from Yakutsk to Fairbanks was nothing unusual and when the fliers landed here Mrs. Wiley Post, the widow of the flier who had blazed their trail several years before, was there to greet them. She happened to be in Fairbanks at the time to dedicate a memorial to her husband and Will Rogers, who died in a plane crash near there.

Home Sweet Home

It was the original plan of Hughes to make the last lap of the flight from Fairbanks to New York in one jump, but after taking a look at the runway at Fairbanks it was decided that the danger in attempting to lift a heavy load of gasoline into the air in such a short distance was too great, and the idea was given up. They spent little time in Fairbanks, and one hour and twenty minutes after they had landed, the ship was in the air again—heading toward New York on the final lap of the round-the-world flight. The fliers left sleeping bags, heavy clothing and a rubber boat at Fairbanks in order to lighten the plane before taking off.

The navigating had been comparatively easy. Connors and Thurlow had run into very little trouble and the ship had maintained a true course throughout the whole flight, thanks to the piloting of Hughes. There had been fairly good weather on the flight so far, and except for a little rain and rough air once or twice there had been nothing serious enough to mention. But a few hours out from Fairbanks the ship ran into some real storms.

The lightning shot jaggedly across the sky and the plane was tossed around like a rubber ball at a beach party. It was hard to keep the instruments in place, and harder still to maintain one's position. When Hughes gave the ship more speed she bucked gamely against the elements. Then he shot her up to around eleven thousand feet. That was better, but the air was still plenty rough. And good reason to be—the plane was sandwiched between two storm areas. Above a second storm was raging. They were flying blind!

Now was the time when everything depended upon the success of the navigation officers. They had to apply every bit of knowledge which they possessed. Hughes had his hands full trying to keep the ship aloft, and Lund was busy trying to help. Stoddard was busy with the radio but the storm disrupted communication to a great extent. It was dark and this made it all the tougher. The fliers were passing through the worst weather of their flight.

This last leg of the flight carried them near the vicinity of the magnetic pole and this made navigation difficult as the instruments became sluggish. Here was where the special navigation instruments in the plane became more than useful. The plane carried a Periodic Compass, a Slow Period Compass and a Pilot's Type Compass. Of these three, the slow period compass helped most on this part of the flight, as it is less easily deflected by the atmospheric and magnetic disturbances.

Despite it, however, the navigator's figures just couldn't be made to agree or coincide, and both Thurlow and Connors were certain for sometime while the

plane was flying blind that the ship was off its course. They knew that flying at their rate of speed it wouldn't take long to increase the error. They tried desperately to locate the spot where they had left the predetermined course, but it was of no avail.

Then when the ship broke out into the early dawn sunlight and they were able to check their course they found they were only ten miles out of the way. There was nothing to worry about. It proved the equipment could be depended upon in any kind of weather and that it was accurate to the nth degree.

Near Minneapolis the gas supply ran low and they decided to set the plane down to refuel for the flight to New York. It was a surprise landing, but there was a considerable crowd on the field as they knew Hughes had expected to land either at Minneapolis or at Edmonton. It was the first time the fliers had touched U.S. soil since they had left New York, and the first real overhauling the ship had received in close to fourteen thousand miles.

At 10:25 on Thursday morning the ship was gassed and ready. She left the runway in perfect style and headed east toward New York. The anxiety to get home and get some sleep was enough to make anyone push the ship a little, and Hughes opened her up for the first time since he had started the flight. The motors had been run only at half speed during the flight and now, when reved, the ship fairly ate up the miles.

The ship flew high over Wisconsin, Michigan, Ohio, Pennsylvania and then New York. The landscape became familiar. Occasional airports came into view; the cities were more frequent and the white strips of highway were clearly visible. The fliers were sure this was America, and she had never looked so good before.

Then they sighted Floyd Bennett Field. There were thousands of people down there and it was a difficult job for any pilot to bring a ship down to land without going into the crowd. But Hughes was still the steady, cool-headed flier. He circled the ship once over the field, then began to ease her into the breeze for a landing. Each inch of that downward glide must have been a lifetime to those in the plane. When the wheels touched the ground they had completed one of the greatest flights in history.

Down, down, slowly down, Hughes jockeyed the plane. Then there was a terrific roar from the crowd and the ship settled to earth and began to taxi up toward the hangar.

A few seconds later the wheels came to a stop.

Many people came rushing forward, breaking through the police lines. Radio announcers and newspapermen were fighting to get near the plane. No one seemed to care about anything. They wanted to get near the fliers and didn't care how they did it. The crew stayed in the cabin for a moment to give the police time to surround the plane. Then they opened the door and stepped to the ground. Mrs. Thurlow was there with the wives of Stoddard and Connors. They had come to welcome their husbands back from the world flight. When Hughes stepped from the plane the crowd mobbed him. He still had on the same hat which he had worn the day he took off, but he looked tired; his eyes were red and he was unshaven. He told newspapermen "Never again," and then made for the car which was to take him away from the airport. Silently the rest of the crew agreed with him that "once was enough."

It was almost impossible to believe.

Shades of Jules Verne—

THEY HAD CIRCLED THE GLOBE IN NINETY-ONE HOURS!

Air Ways

(Continued from page 27)

a ten inch propeller. An R.A.F.-32 airfoil is used in the wing. He says:

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BAMBOO PAPER 24x36 ..each .05

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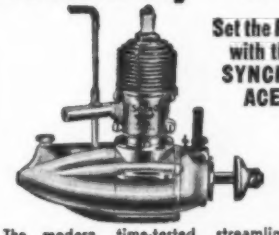

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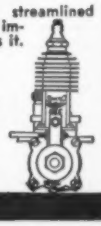

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1x1.....1 for 5c	**Mach. Cut Wins**	per yard.....40c
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2x6.....1 for 38c	8" 7c.....20c	1/8x1/4.....10 20c
3x6.....1 for 72c	9" 8c.....24c	3/16x3/16.. 8 20c
NOSE BLOCKS	10" 8c.....27c	1/4x1/4..... 6 20c
1x2x1..... 1c	12" 10c.....35c	1/4x1/2..... 3 20c
2x2x1..... 2c	14" 14c.....55c	3/8x3/8..... 1 8c
2x2 1/2x1..... 3c	15" 15c.....48c	1/2x1/2..... 1 10c
3x3x1..... 5c	**ALUM. WHEELS**	**Specify whether hard or soft. Add 25c pack. charge on 5 ft. lengths.**
3x3x2..... 8c	1" pr. 6c	
3x3x3..... 10c	1 3/4" pr. 11c	
3x3x3..... 25c	1 7/8" pr. 14c	
18" BALSA	**Sheet Aluminum**	**WASHERS**
1/16x1/16 100. 5c	.003.....sq. ft. 10c	1 doz. 1/8 or 1/4 1c
1/16x1/8 35 for 5c	**ALUM. LEAF**	**DUMMY RAD. ENGINE (Celu.)**
1/16x3/16 18. 5c	2 Sheets for 1c	1 1/2" dia..... .08
1/16x1/4 15 for 5c	**TISSUE, AA**	2" dia..... .12
3/32x3/32 30. 5c	All col., doz. 19c	2 1/2" dia..... .14
1/8x1/4 30 for 5c	Silver .....ea. 5c	3" dia..... .17
1/8x3/16 12 for 5c	Superfine, wh. 5c	**THRUST BEARINGS**
1/8x1/4 10 for 5c	**CAMEL'S HAIR BRUSHES**	1/2 Doz. Small 4c Large 6c
3/16x3/16 8. 5c	Small 3c; med. 5c	
1/4x1/4 6 for 5c	Large..... 8c	**INSIGNIAS—French, American, English, German**
1/4x1/2 3 for 5c	**BAMBOO PAPER** 2 for 5c	1 1/2" .....4 for 3c
18" Balsa Sheets	**Wood Veneer**	2" .....each 1c
1/64x2 6 for 10c	20x30".....1 for 9c	24 and stripes 5c
1/32x2 9 for 10c	2 for 17c	**DOWELS**
1/16x2 8 for 10c	**11 in. BAMBOO**	1/16x6 .....doz. 5c
3/32x2 7 for 10c	1/16x1/4 6 for 5c	3/8x18 .....2 for 3c
1/8x2 6 for 10c	Shredded 40—5c	3/16x18 .2 for 5c
3/16x2 3 for 8c	**REED**	**WIRE**
1/4x2 3 for 9c	1/32 or 1/16"	6-8-10-12-14
1/2x2 2 for 11c	1/4 in. .....3 ft. 2c	.....2 ft. 1c
3" sheets or 36" lengths, double above prices; add 10c packing charge for 36" lengths.	**CEMENT**	3 ft. for 2c
	CLEAR DOPE THINNER	**NOSE PLUGS,**
PROP. BLOCKS	1 oz. 5c, 1/2 pt. 30c	1/2".....1 doz. 5c
1/2x3/4x5 7—5c	2 oz. 8c, pint 50c	3/4".....1 doz. 10c
1/2x3/4x6 6—5c	**Colored Dope**	**MODEL PINS**
3/4x1x8 3—5c	1 oz. 5c, 1/2 pt. 25c	Pkg..... 5c
3/4x1 1/4x10 2—5c	2 oz. 9c	**PROP. SHAFTS** 2 for 1c
3/4x1 1/4x12 3c ea.	**MICROFILM**	**SANDPAPER**
1x1 1/2x12 5c ea.	One oz. bottle 10c	Doz. sheets 5c
1x1 1/2x15 6c ea.	**Sheet Celluloid**	**BOMBS**
1x2x18 9c ea.	2x6—2c 6x8—4c	3/4"....4c 1 1/2"....7c
WHEELS per pr.	12x16..... 15c	2".....12c
Birch Bliss Celu	**RUBBER LUBRICANT**	**GUNS WITH RING MOUNT**
1/2 .01 .03	Large bottle 10c	1 1/4" 10c 1 3/4" 15c
3/4 .02 .04 .05	**WING AND TAIL LIGHTS**	
1 .03 .05 .07	12" 10c; 15" 15c	
1 3/4 .04 .07 .10	**BROWN RUB.**	
1 7/8 .06 .09 .16	1/16 sq. 15 ft. 5c	
3 .12 .30	1/8 flat 15 ft. 5c	
Alum. Tubing	3/16 flat 12 ft. 5c	
1/16", 3/16", 1/4".....10c ft.		

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pire Flying Boat and on the right a Sikorsky. He was not satisfied with building merely a two-motored job, but, as you can see, both these ships are of the four-motored type. The framework of these ships is of 1/4" balsa covered with 1/16" sheet stock. The Empire Flying Boat has a span of sixty inches. It is finished with five coats of clear and four coats of aluminum dope, giving it a metallic appearance. Within the hull a complete electrical system has been built which runs on flashlight batteries. On the whole these ships are a very unique piece of work.

Picture No. 5 shows the three winners of the Loew's Theatres "Test Pilot" Model Plane Contest, finals of which were held at Floyd Bennett Field, New York. Left to right they are: George Iaccino of 24 Pine Street, New Rochelle, New York, who was second with a model of Silkorsky S-39; Carl Baum of 27 Jayne Avenue, Patchoque, New York, who was first with a model of a Seversky P-35. This is a beautiful little job, made in careful detail. Frank Fisher of 412 East 81st Street, New York, was winner of third place with his Fokker. The young men are holding their winning ships and the trophies which were awarded them.

We spoke of Jim Cahill in the first part of this column. Here, in picture No. 6, we show you the Air Ways Trophy which he now holds and his plane which won it. This is the same ship which flew to victory in the Wakefield contest. Jim tells something about his model. He says:

"It was designed and built expressly to bring me a trip to England for the 1937 Wakefield. It was not flown before the day of the Wakefield elemination event. In fact, I sat up all night, after I got to Detroit, to finish it. It was test-hopped the day of the eliminations. In the event it made three flights of one minute, six seconds; thirteen minutes, thirty-three seconds; two minutes, twenty seconds. This second long flight was the result of a thermal."

The model was slightly damaged after these flights and Jim spent most of the following day repairing and preparing it for the Moffett event. In this event it flew, on its first flight, for fifteen minutes, forty-five seconds. It was lost at this time and not found and returned to Jim until November. This little ship has had a remarkable record and probably has won more contests than any other single model ever built. Unquestionably the excellent flying qualities are due to several things: To very strong but light construction, careful design arrangements, very careful streamlining and a folding propeller which helps to reduce resistance, and practically makes this ship a soaring glider after the propeller stops.

A year or so ago Mr. Stephen A. Lambert, Jr., 2053 East 96th Street, Cleveland, Ohio, sent us several pictures which he had taken by a professional photographer, at some expense to him. We are afraid that he was somewhat hurt that they have not been published. May we relieve his feelings and say that all professional photographers do not take good pictures. In fact, we have received a number from this class of individual which have been atrocious as far as reproduction in the pages of a magazine is concerned. Young men should not feel hurt if we do not publish their model pictures. Sometimes it does them more harm if we publish them, as some very fine model work often is made to look like pieces of junk by poor pictures. Naturally this reflects upon the builder. In selecting our pictures carefully we respect the reputation of the builder who contributes to us.

Nevertheless, Mr. Lambert has sent us three other photographs of solid scale models he has built. The pictures themselves are unusual, and they clearly show that very fine workmanship has been executed in the building of these models. These pictures are No. 7, 8, 9. Picture No. 7 is a Fokker D-8; No. 8, a Hughes racer and No. 9, a Howard racer.

The unique thing about the Fokker is that it has a built-up rotary motor and other details such as movable controls, machine guns and a completely outfitted cockpit. The Hughes racer is also unique for the detail of the motor. This has been built up very carefully, even to the spark plug wires. Believe it or not, this plane has a retractable landing gear which operates! Mr. Lambert tells us that the Howard Mike is "just a model" outside of the finish, which he says is excellent.

Most model builders are content to stick to orthodox lines of design. This procedure often guides many into a rut from which they never can pull themselves into the sphere of originality. Consequently when we receive the result of some original thought we are highly impressed. We get this reaction from picture No. 10 which has been submitted by Ed. Beshar of 329 East 54th Street, New York City. At a first glance the ship looks like a very much enlarged mouse. Actually it is a puller-pusher model with the fuselage built in such a shape that it will contribute a certain amount of lift to that generated by the wings and reduce the usual resistance to a minimum. In spite of it peculiar design, actually this arrangement has shown remarkable results and flies beautifully. It has an exceptionally steep climb and is quite stable. The important thing about all this is that Mr. Beshar is doing some original thinking and is not following the crowd.

If you want to see some fine examples of model construction, see Mr. Julius

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Tail Wheel Included

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Toth of 205 Burgan Street, Welland, Ontario, Canada. If you do not believe us, look at picture No. 11. Here is shown a Bell fighter before the covering was put over the framework. Without doubt this is the most remarkable piece of model construction work, in respect to detail, we have ever seen. Mr. Toth tells us it took him 334 hours to make and put this intricate structure together. The detailed plans were made up from plans of a solid scale model. The plane has a fifty-two inch wing spread. The wings are removable for convenient transportation. Access to the controls is made possible by a removable hood in the fulesage. There are eight controls which include rudder, stabilizer, ailerons, flaps, retractable tail wheel, brakes on the front wheels and variable pitch propellers. In respect to detail, this model certainly "takes the tin hat." Mr. Toth tells us he has made over thirty models in the last three years. At the present he is seventeen years old. We appreciate this contribution very much indeed.

Contests

Here is some news concerning contests, in which our readers may be interested.

Frank F. Dallaire, of 19140 Crocuslawn Avenue, Detroit, Michigan; who is president of the Detroit Chapter N.A.A., tells us that they recently held their first contest. There were 63 entries in the Wakefield Model Event and 160 in the Gas Model Event. The meet was sponsored by Crowley-Milner and Company and conducted by the Detroit Department of Recreation. It was run under N.A.A. rules and held at a large field at Southfield and Nine Miles Road, Detroit. The winner of the Wakefield Event, Junior class, was Robert Gieryn with a time of 2:03.2; and in the senior class, Walter Skeele, with a time of 6:53.6. Tom Espenship won the Gas Model event with a flight of eight minutes, fifty-one seconds, on a thirty-second motor run.

The Syracuse Model Airplane Club, Y.M.C.A., Syracuse New York, sponsored the annual New York State Fair Model Meet, held on September 4th. About $150 worth of prizes, consisting of trophies, medals and plaques, were given to the winners. As soon as full details are obtained they will be printed.

It appears that the "New York Times" is behind the times, for we have just noted an item concerning model planes which does not deflect glory on it in the least. The title of the item is: "Title for Toy Airplanes Won by American Boy." The article goes on to tell how Jim Cahill won the Wakefield Trophy. However, it appears that such a worthy and supposedly well-informed newspaper does not know enough not to call a highly scientific and beautiful miniature airplane a "toy" airplane. After all, a toy is merely something to be played with, not something by means of which serious research is done and from which healthful sport and international good will is promoted.

CLUB NEWS

Connecticut

Alfred W. Schmidt of 29 Vernon Street, Hartford, Conn., sends us a report of the recent activities of the Model Aero Engineers of Hartford. He says:

The second annual City Model Airplane Meet, sponsored by the amusement committee of the Board of Aldermen, was held on July 4th at Brainard Field, Hartford. The contest was sanctioned by the National Aeronautic Association and conducted by the Model Aero Engineers of Hartford, a Junior NAA Chapter.

Henry Borcynski won first place in the junior rise-off-ground commercial event with a time of 2 minutes, 30 seconds; and his brother, Joseph, won the senior event with a time of 1 minute, 11 1/2 seconds.

Second place in the senior division was taken by Frank Lattanzio with a time of 1 minute, 11 seconds, and the second place in the junior division went to Charles Lattanzio, his brother, with a time of 55 1/2 seconds.

Henry Borcynski's flight established a record for the city meet and it also tops the state record. About 32 model makers, most of them members of the Model Aero Engineers of Hartford, took part in the meet. A silver trophy went to each first place winner and a gold medal to each of the two in second place.

The meet was completed in three hours, giving each contestant his three official flights, due to the co-operation given the Model Aero Engineers by Mr. Frank Hendron, airport manager, and the Hartford Aviation Commission. Alfred W. Schmidt, senior advisor of the Model Aero Engineers, was contest director. Aviation Commissioners Medos J. Palshaw and Edwin F. Hopfer were officials. Also judging were Paul A. Schmidt, James Grant and Alfred H. Pepin.

The Model Aero Engineers of Hartford have just been granted complete co-operation from the Hartford Aviation Commission as to the use of Brainard Field for model airplane contests and activities. The club applied for a charter making them a Junior Chapter of the National Aeronautic Association which is one of the most progressive steps taken by the group since it was organized in September, 1935. An active program is being planned in which all members will receive instruction in various types of model construction, finishing and flying. Speakers and contests are also on the program.

Mr. Alfred W. Schmidt, an official N.A.A. contest director, will officiate at all contests of the club and act in the capacity of director of the club, as he has been doing in the past. All model builders in the vicinity of greater Hartford who are interested in the club can secure information on how to join by writing to Mr. Schmidt, 29 Vernon Street, Hartford, Connecticut.

The Model Aero Engineers of Hartford which has a reputation of being the most outstanding model aircraft organization in the state of Connecticut, obtained twelve prizes out of a possible twenty-four in the tenth annual Connecticut Model Aircraft Meet. The contest was held on Rentschler Field, sponsored by the United Aircraft Corporation, held under the direction of the Connecticut Model Airplane Association and the Hartford YMCA, and sanctioned by the Na-

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tional Aeronautic Association. One hundred and twenty contestants entered the meet and came from twenty-two communities throughout the state.

Erward Rosen, who is the presiding officer of the club, established a new state record of two minutes and fifty-seven seconds with an outdoor commercial model, and started the tow-launched glider event off with a state record of one minute, forty-five and three-tenths seconds. He also took the major award in the senior division, which is the George S. Wheat Memorial Trophy. Irwin Goldenberg set a new state record in the junior outdoor stick class with a time of one minute, forty-seven and eight-tenths seconds.

The club members winning awards are as follows:

Senior Division

R. O. Y. Commercial

1st—Edward Rosen.
2nd—Bernie Banowich.
3rd—William A. Purtell, Jr.

Outdoor Stick

1st—Bernie Banowich.
3rd.—Frank Lattanzio.

Glider (Tow-launched)

1st—Edward Rosen.
3rd—Frank Lattanzio.

Solid Scale

3rd—Raymond Rosen.

Junior Division

R. O. G. Commercial

1st—Arnold Michaelson.

Outdoor Stick

1st—Irwin Goldenberg

Glider (Tow-launched)

3rd—Hoyt Grant.

Solid Scale

1st—Charles Downey.

Illinois

Frank J. Parykaza, publicity director of the Illinois Model Aero Club of 430 South Michigan Avenue, Chicago, Illinois, writes as follows:

"Alvin Anderson and Bill Gough have recently perfected a rather unique type of indoor model of the stick type which should 'run away with the groceries.' Low aspect ratio wing, large stabilizer and a very efficient prop are its main features. More information and pictures will be available soon. Thank you very much for the previous mention of the Aero Club in your publication."

Pennsylvania

One of the newcomers to the Air Ways Club is the Franklin Model Airplane Club of 233 Grant Street, Franklin, Pa. The club, formed on July 8th, has joined up "en masse." The officers are Raymond Young, commander and Gordon Cross, secretary-treasurer. Other members are: Harry Montgomery, Isaac Brink, Louis Sanderson, Frederick B. Seabrook.

News Item

An amusing news item has come to us, which is as follows:

Ever since Herman Schapansky received four flying lessons for doing chores at Clinton, Okla., airport, he has wanted to fly his butter and eggs to market.

On July 8th, the 31-year-old farmer took to the sky, with his cow-chasing collie dog; but he cracked up in his home-made airplane. He has crashed so often that he has lost count of the times. The only passenger who ever accompanies him is his dog.

His latest crash, Schapansky revealed, did not scare him. His monoplane, patched together from pieces of junked airplane and automobiles, lost a wheel after taking off from his bumpy cow pasture landing field.

While Schapansky, 800 feet in the air, wondered what to do, his wife hitched the trailer to the family car. Ever since he made the airplane, Mrs. Schapansky has traveled across the countryside helping extricate him from the wreckage and placing the scattered airplane parts on the trailer for the journey home.

"I held my breath and side-slipped her down, easy-like," Schapansky said. "We hit the grass and went wiggling across the pasture like a crippled duck, then folded up against the fence."

"Don't worry, mom," said Schapansky crawling out of the wreckage, "the blacksmith can patch up the old bus good as new."

Mrs. Schapansky said she was afraid he could.

Notices

Mr. Harry G. Vogler, Jr., Director of the Aircraft Division, Boys Club of Pittsburgh, 4412 Butler Street, Pittsburgh, Pa., has just compiled a glossary of model aircraft definitions and notes for use in the P. W. A. Recreation Department classes of Allegheny County, Pa. We wish to congratulate Mr. Vogler on his very extensive and thorough compilation of data which we are sure will be helpful to the many aeronautical-minded youths into whose hands it may fall. Complete definition of all aeronautical terms are given, as well as a complete description of all insignia used on service airplanes. All airplanes have registration numbers, but few people know what they mean. Mr. Vogler's work also contains a complete list of designations used on airplanes, their meanings and the countries which use them.

We have a very unusual request. It comes from Mr. Bernard Hyzinski, age 13, of 113 North Empire, Wilkes Barre, Pa. Possibly there may be room for some amusement here. We are sure, however, that Mr. Hyzinski is serious in his intentions. He wishes the names and addresses of any girls who are Air Ways Club members. Therefore if any young ladies read this notice will they kindly get in touch with Mr. Hyzinski?

Mr. Hyman Cohen of 1512 Union Street, Brooklyn, New York, would like to get in touch with a number of young men, about nineteen years old, who would be interested in forming a club for the purpose of building a radio-control gas job. He would prefer it if they live in Brooklyn, New York.

J. Howard Claypool, Commander-in-Chief Junior Air Corps, writes that the San Jose W.P.A. Junior Air Corps has

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3/32 x 3..... .42
1/8 x 2..... .23
1/8 x 3..... .46
1/4 x 2..... .42
1/4 x 3..... .84
1/2 x 2..... .75
1/2 x 3, 10 for..... .75
18" Planks
1 x 1½ each .05
1 x 2 each..... .08
1 x 3 each..... .10
1 x 6 each..... .18
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2 x 4 each..... .23
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½ x ¾ x 6.. .06
⅝ x 1 x 7.... .14
¾ x 1 x 8.... .18
¾ x 1½ x 10 .25
¾ x 1¼ x 12 .30
1 x 1½ x 15 .48
Balsa Nose Blocks
1"x2"x3" 6 for..... .11
1"x3"x3" 6 for..... .18
2"x2"x2" 6 for..... .15
BAMBOO
1/16 sq. x 12" Gross ..... .19
1/16 x ¼ x 15" Doz. ..... .06
Gross ..... .65

DOWELS
1/16 x 12" 2 Doz..... .18
⅛ x 18" 2 Doz..... .23
3/16 x 36" 1 Doz..... .35
BALSA CARVED PROPS.
5" Doz..... .30
6" Doz..... .38
7" Doz..... .48
8" Doz..... .50
10" 6 for..... .40
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PAULOWNIA WOOD HAND-CARVED STANDARD PROPS.
3" 6 for..... .25
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1¼" Doz..... .19
1¾" Doz..... .35
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One Dozen..... .05
SANDPAPER
6 assorted sheets to package. 12 Packages.. .34
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Small or Large 100 ..... .08
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20"x24" Per Doz.
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BROWN RUBBER
1/16 sq., 225 ft. ..... .48
⅛ Flat, 225 ft. ..... .50
3/16 Flat, 225 ft. ..... .60
WIRE
.020, 100 ft. .30
.028, 100 ft. .30
.034, 100 ft. .35
BENT WIRE PROP. SHAFTS
Dozen ..... .10
Gross ..... .75
ALUM. TUBING O.D.
1/16", 6 ft. .25
3/32", 6 ft. .28
⅛", 6 ft.... .32
3/16", 6 ft. .43
¼", 6 ft..... .50
SHEET CELLULOID
12½" x 16", Each ..... .15
BUSHINGS
Small, 100.. .15
Med., 100.... .20
Large, 100.. .25
THRUST BEARINGS
Small, Doz... .06
Gross ..... .55
Large, Doz.... .07
Gross ..... .70
MODEL PINS
12 Packages .30
INSIGNIAS
Dozen sheets .36
TRU-CUT BALSA KNIVES
Per Dozen.... .85
Extra Blades, 2 Doz..... .85
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Diam. 1½", 12 for .40
2", 6 for..... .45
3", 6 for..... .55

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½ oz. Btls., per gross (144)..... $2.75
1 oz. Btls., per gross $3.50
Quart Cans, 4 Cans..... $1.95
1 Gallon Can $1.50
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Clear Dope—Same low prices
Remit with order. Shipment express, shipping charges collect.

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● Helical pitch, accurately made, gas model propellers. Machine made in America.

Diam.	Blanks	Semi-finished	
10"	$.20	$.35	Blanks are center
11"	.20	.35	drilled, precision
12"	.20	.35	tapered, of select
13"	.25	.50	Whitewood. Semi-
14"	.25	.55	finished propellers
15"	.25	.60	require only fine
16"	.25	.75	sanding and doping.

● Highest quality gas job silk—$.40 sq. yd. Cement and Clear Dope—8 oz., .35; Pint, .55.
● We have the newest small engines: Bantam, $16.50; "Elf", $21.50; Ohlsson "23", $16.50; Atwood "Phantom", $9.75.
● For an airplane powered with one of the above engines, the new M & M 2⅝" airwheels at $.90 are ideal.
● Orders of $2.50 or over for the above items are sent postpaid. Orders less than $2.50 will have to include 15 cents postage. Send a postal card for our latest catalog.
● We stock all advertised gas model accessories for immediate delivery.

Junior Aeronautical Supplies Co.
83 East 10th Street New York, N. Y.

moved to new quarters at the City Hall in San Jose, California.

In Windsor there was recently organized the Western Ontario Model Aircraft League. This club was formed with the intention of encouraging model building among the youth of Western Ontario. The League is under the direction of L. Walters. The secretary is Mr. Ed Romiens, 1685 Highland Ave., Windsor, Ontario, Canada, treasurer of the League is Mr. Ted. Ridley.

It is our hope that all builders in the district will join up with us so that model builders in Western Ontario may enjoy the benefits of organization, that anyone interested should get in touch with the secretary.

Gas Lines

(Continued from page 25)

July 4th.

"Four seaplanes participated, piloted by such auspicious leaders as Dan Bunch, Bud Warren and Irwin Ohlsson of Los Angeles and Dr. Young of Lemore, California. Dan Bunch and Bud Warren flew "Scorpion Major" designs of 57" wing spread. Irwin Ohlsson flew his 5 ft. Pacemaker and Dr. Young had a 6 ft. cabin type ship which weighed over 6 lbs. All the airplanes were equipped with the Bunch Gull Float Gear of three-float design.

"Many flights were made over the lake on Saturday and Sunday. Nosing over in the water seldom happened and, best of all, no one damaged a single part of his seaplane. In view of the fact that two of the ships were being tested for the first time with floats this shows one inherent advantage of seaplanes.

"This Seaplane Regatta was not conducted as a duration contest, but nevertheless Bud Warren made the longest flight of the meet with an estimated time of 15 minutes. The ship flew out of the lake only to shoot a perfect landing on dry land. It is hard to believe but with a correctly designed set of floats a seaplane in a natural glide will skid along the hard ground without turning over.

"To further illustrate the utility of seaplanes I might mention our most recent experience this last week-end. The two seaplanes were taken to Big Bear Lake, which is one of California's highest altitude resorts. The surface of the lake is 6800 feet above sea level. The air, of course, is less dense than an approximate sea level. While the take off runs were twice as long as at sea level, the seaplanes took off and flew beautifully. We have made tests and found that we could effect take offs at this altitude at 3/4 throttle setting with a Gwin Aero motor. A duration timer stuck on one ship and even at this altitude it flew almost from sight and must have ascended at least 2500 feet. This means the seaplane climbed with power on to an altitude above sea level of 9300 feet."

Mr. Ralph Lowe of 382 South 19th Street, San Jose, California, sends us picture No. 2. Here he is shown holding his gas model of very unusual design. You will note that the stabilizer is built in the shape of a "Vee." This type of design enables the stabilizer to act as both horizontal and vertical tail surface. In fact it has worked

FLY THE *AIR CHIEF*
A RECORD BREAKER

$6.00
Complete without Motor

61" wingspan, length 39"
weight 2¼ lbs. without motor

Equip with any standard miniature engine. Kit includes—Wood cut to size, Pneumatic Air Wheels, Formed Shock Absorbing Landing Gear, Die cut Ribs, all needed Parts. Complete without motor **$6.00.**

U. S. S. HARTFORD

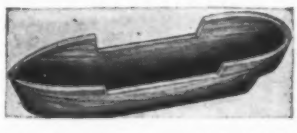
Historic Beautiful Complete
At last the flagship of Admiral Farragut is yours to build. The kit for this 20" model contains: Balsa hull block, 3 sheets printed wood, cement, lacquer, shellac, piano wire, cast metal anchor, cast metal boats, steering wheel, funnel tubing, dowels, sandpaper, rigging thread, beads, and full size plan.
$1.00 Complete

CUTTY SARK

Carved wood hull printed balsa decks. Cast metal: lifeboats, anchor, bitts, steering wheel, chains. Masts, spars, rigging cement, colored lacquer, full size plans, instructions.
COMPLETE..... **$2.50**

Complete Catalog 10c

DEALERS



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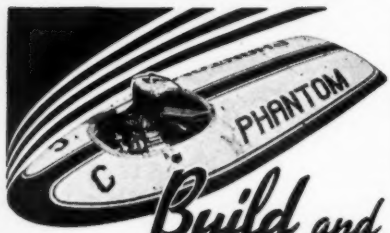

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out so nicely that it has recently won several prizes around Santa Clara Valley. This ship is flown nearly every Sunday by Mr. Lowe at Moffett Field, Sunnyvale, California. It weighs four pounds and is powered with an Ohlsson 37.

One of the most beautiful jobs that has ever come to our attention, and unique because of its design, is shown in picture No. 3. This is a biplane gas model constructed by Robert Potter of 116 East York Street, Ithaca, New York. Mr. Potter gives credit to MODEL AIRPLANE NEWS for much of the design material used in working out the plans of this ship. Drawing the plans and building the model required about 600 to 700 hours of work. The ship is wire-braced and has a sixty-three inch span. It weighs 4-1/2 pounds. The motor used is an inverted Ohlsson. The fuselage is cowled from a solid block of balsa and hollowed out to a thickness of 1/4" at the front, tapering to 1/8" at the rear. Laminated balsa bulkheads are spaced four inches apart within the fuselage. One of the unique features of the plane is the wing flaps with which it is equipped. A photographic timer controls this, as well as the motor. The motor run is thirty seconds after which the flaps start to descend, taking about fifteen additional seconds to lower completely. Mr. Potter has had a little difficulty in getting his motor to run satisfactorily in the plane, although it runs beautifully on the block. As soon as this trouble is worked out he intends to test-hop the ship.

A large model contest was held recently at North Anderson, Indiana, in a large field on the Cross Street Road. This affair attracted a large number of spectators. Picture No. 4 shows Mr. Robert Williamson of 1519 Morton Street, winner of the senior class event, starting his model from the run-way. He is assisted by his mechanic. The flight of his ship lasted three minutes, forty-one seconds, which won him an award of $10.

This was the third annual model airplane contest sponsored by the "Bulletin."

Picture No. 5 shows Owen Chapman holding Don Donahue's five foot gas job. Donahue lives at 5906 Tipton Way, Highland Park, California. This little plane was built in the summer of 1935 and has taken part in the various contests held up and down the Pacific coast. It won one contest in 1936 and has placed among the first ten in numerous others. After hanging on the wall of Donahue's residence for six months, as a decoration, the ship was taken down and given a trial at the Santa Barbara contest last June. It scored ninety points out of a possible hundred on two flights to take eighth place. Mr. Owen Chapman developed the power plant which is used. Donahue says that this motor was the first to use a small spark plug 1/4-28, and a finned cylinder.

Ralph Guernsey of Posey, California, has built a very fine looking scale gas model of a Polish Fighter. It is shown in picture No. 6. The ship has a span of sixty-three inches and weighs 4-1/2 pounds. It is powered with a Brown C motor. The wing spars were built up of sheet balsa and were very carefully drawn out, as were the wing ribs, so the wings are tapered in all ways as is the case of the large ships.

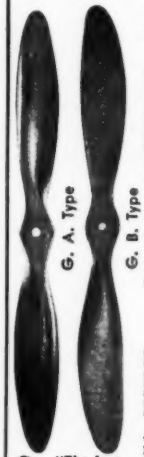
Kansas

We have news from Mr. Leo Rutledge, that very live gentleman who resides at 302 South Lorraine Avenue, Wichita, Kansas. We wish to say we feel that Mr. Rutledge has done as much, if not more, for gas model aviation in any one community as anyone else in the country. He is one of the most sincere, ardent workers in this field. Mr. Rutledge writes us as follows, concerning model activities in his community:

"We are anticipating big things in the gas model field in this area. Many efforts

THANKS A Million!

AND to quite a few more satisfied users of I.M.P. PAULOWNIA and I.M.P. SAKURA (cherry wood) PROPELLERS. Our records disclose over 1,168,674 model builders have used I.M.P. PROPS—and no kicks—our files are loaded with testimonials—we also wish to thank those manufacturers of high class kits who use I.M.P. PROPS as standard equipment



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12" — .....60c each P.P.
12½"— .....70c each P.P.
13" — .....75c each P.P.
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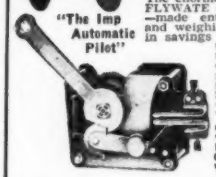
SPECIAL OFFER TO PURCHASERS OF OUR GAS PROPS—3 sheets of our 24 x 36 Super Impaero Bamboo Paper for Gas Models—usually sold at from 5c to 40c per sheet—3 sheets with your order for props at only 10c.

Another Important Announcement

The enormous demand for our new FLYWATE 0 to 55 seconds TIMER—made entirely of Duraluminum and weighing only 1 oz. aided us in savings which we now pass on to you. This precision made vibrationless timer is a necessity on all gas jobs. The former price of $2.50 is now reduced to **$2.00** P.P. (You can buy a gas prop with the difference.)



0 to 5 min. Timer—weight 2¼ oz. $2.00 P.P.
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and hours have been expended in the past to promote model aeronautics in this territory and I believe that at least part of these efforts are reaching a happy culmination. To be more explicit, the Wichita Junior Chamber of Commerce has taken a very definite step in further promoting this program by virtue of the fact that they have leased a 147 acre tract to be used exclusively for the flying of model craft. This field has a nice hangar building that is available and may be used for indoor construction of ships, test flying, etc. I might add in regards to the field that flying at the Municipal Airport had become almost a hazardous undertaking due to interference with the regular commercial lines, is being entirely eliminated as the field is out of line from such obstacles. The field proper is very level and is covered with a natural sod of "buffalo grass." The place of take-off for the model craft is as smooth as any golf green I have ever had the pleasure to see. Woe be unto the person who would endeavor to drive across it.

"We feel that Wichita is fortunate indeed to have so many zealous boosters for model aviation and you are going to hear much from us in the future in regards to the progress that we are making in this field.

"There was a gas model contest held at this field on July 10. It was a huge success."

Mr. Rutledge also sends an insert in his letter which is being put out by the Crime Prevention Division of the Wichita Police Department. We wish to call the attention of other welfare and civic organizations to this bit of news. Members of the staff of MODEL AIRPLANE NEWS have felt for some time that the sport and educational pastime of model plane building provides a most healthful outlet for the mental and physical activities of American youth. In this way it thwarts tendencies to divert such activities into harmful channels. Wichita is the first community, to our knowledge, to recognize this fact and to use model aeronautics as a means of healthful recreation for the direct purpose of crime prevention. Mr. Robert Van Weldon, Adjustment Officer, writes as follows:

"The investigation of offenses committed by juveniles reevals the fact that the offender too often has no supervised recreation or has not made proper use of his leisure time, hence the offense was the result. With that thought in mind, the Crime Prevention Division of the Wichita Police Department, cooperating with other organizations, has organized a class in model airplane building and aeronautics in an effort to reduce juvenile delinquency in the city.

"Instrumental in the organization of the project were: Bernie Goodrum, Director of Recreation of the Park Department; Leo Rutledge, member of the National Board of Directors of the Gas Model Division of the National Aeronautical Association and Supervisor for the State of Kansas; Mr. Merle Williams and Fred Just, members of the Junior Chamber of Commerce; F. X. "Bill" Downey, Instructor in Model Aeronautics; Captain Harry McCormick and Officer R. A. Van Welden of the Crime Prevention Division of the Wichita Police Department.

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The Lightest Complete Ready to Run Gas Motor on the Market

The New "Auto Type Snap Spark Ignition" Starts the "HUSKY" Right Now—This new feature does away with the breaking of the stiff old style upper spring used on the Husky Jr. Also you don't have to dismantle the timer to clean and adjust the points, which can be done in a few seconds. We guarantee the "Husky" to give you 100% satisfaction.

The NEW "HUSKY" runs Equally as well Upright or Inverted and was Designed to Fly Models Weighing from 16 oz. up to 3½ lbs. The "HUSKY" will run Steadily at any Speed from 250 R.P.M. to 6000 R.P.M. using either a 11" or 12" Prop. The NEW "HUSKY" is BEAUTIFULLY FINISHED THROUGHOUT—It is BUILT to WITHSTAND any TEST it is put to—Each motor is THOROUGHLY TESTED, RUN IN and FULLY GUARANTEED to GIVE you Consistent Performance and LONG LIFE. ⅝" bore, ⅝" stroke. Wt. ready to run 6½ oz. Including two pencells for Current.

We are going to see to it that every HUSKY owner will be completely satisfied and a hundred per cent booster. You can't go wrong. ORDER YOUR HUSKY TODAY! IMMEDIATE DELIVERY.

Husky motor mounts, wt. ⅝ oz., per pr., postpaid .50c
Husky Non Brittle prop. 11" or 12" each, postpaid $1.00

Husky complete ready to run (less motor mounts, batteries and prop.) Postpaid..... **$12.50**

If your dealers do not sell HUSKIES order direct from

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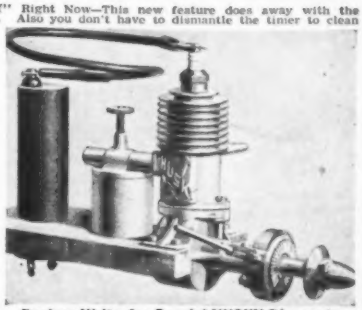

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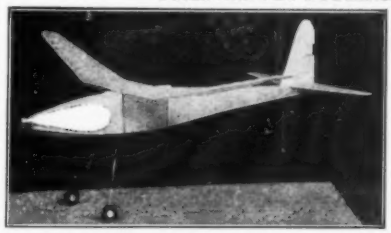

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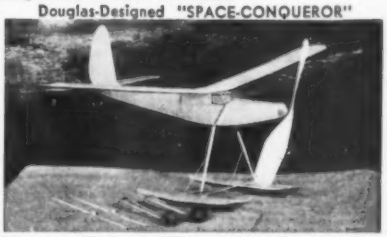

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Michigan

A gas model plane contest, which drew one of the record-breaking crowds of the year, was held at Lindbergh Field, Kalamazoo, Michigan. It was sponsored by the Kalamazoo Chapter of the N.A.A. Between ten and twelve thousand persons witnessed the program, and although no records were broken, the planes made excellent time in their flights. One of the features of the affair was an event for accuracy displayed in precision flights. Roy Kuennen, 123 Strait Street, Grand Rapids, took first place in the duration event. Raymond Slominski, 1137 Lake Michigan Drive Grand Rapids, won the precision event. Richard Miller, Route 2, Sturgis, won the honors in the payload contest.

New Jersey

Mr. Frank M. Krysiak, advisor of the Linden Model Aircraft Club, Old City Hall, Linden, New Jersey, tells us that the first annual New Jersey State Contest, held on June 25th, at Hadley Field, was a great success in every detail.

Seventy-one gas model builders from twenty-eight New Jersey towns and cities vied for the state championship, which was won by Arthur Gray of the Queen City Gas Model Club of Plainfield. The winner had a flight of four minutes. His model flew out of sight but was recovered.

In the open event, which was open to contestants from New Jersey and neighbor-

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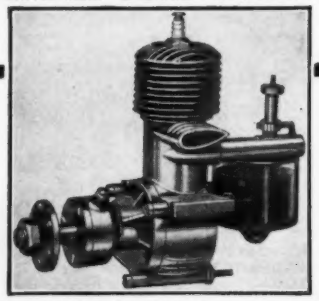
SMALL BORE ENGINE



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The Ohlsson "23" has plenty of power to fly a 3 lb. model, yet is small enough to fly a 20 oz. job—in other words, it's the perfect "3/8" for every small ship.

Like its big brother the Ohlsson "23" is built from the finest materials money can buy and is assembled and tested under the rigid supervision of the same men who have made Ohlsson motors first choice with model fans the world over.

Compare the Ohlsson "23" part by part with any other motor of comparable size on the market —and we'll let you be the judge!

SPECIFICATIONS

Horse Power 1/7", Stroke 3/4", Bore 5/8", Bare engine weight only 4½ ozs., Height 3 9/16". Mounting—combination radial or lug. Dural I-Beam connecting rod. Bronze Bearings. Carburetor—Special needle type mixing valve flying speeds. Crankshaft—¼" machined from solid stock. Timer—fully enclosed, adjustable. Smith ignition coil. Spark plug—Champion ¼" x 32. Gas tank—special clear transparent composition. The fact that all parts are completely interchangeable makes replacement easy and economical. Ohlsson motors operate upright or inverted. Order your Ohlsson "23" engine now for immediate delivery. Complete with coil and condenser.

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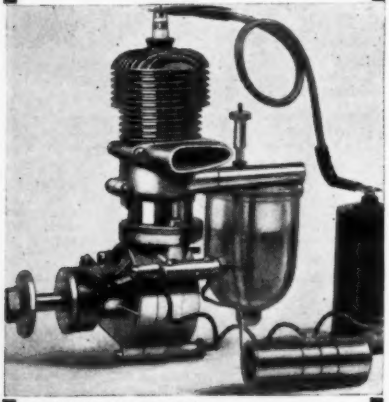
Including special design propeller, oil and Double Guarantee.



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SPECIFICATIONS

Horsepower 1/5, Bore 7/8", Stroke 13/16", Motor Speed 500 to 10,000 r.p.m. Bare engine weight 8 ozs. Mounting—combination radial or lug mounts. Dural I-Beam connecting rod. Bronze bearings. Carburetor—special needle type. Light Weight ignition coil. 3/8"—24 Champion Spark Plug. Fully enclosed timer. All parts completely interchangeable. Operates either upright or inverted.

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SCIENTIFIC

218-220 MAIN Market St., Newark, N. J.

ing states, Martin Powell of the Metcalf Aero Club, Bronx, N.Y., took first place with a flight of 3 minutes, 50 seconds. His plane flew out of sight on the winning flight but was recovered. This model landed at the Shackamaxon Golf Course in Westfield and was found by a caddy, who reported it to the Westfield Police. Eighty-six contestants competed in this event. Entrants from Connecticut, Pennsylvania, and New York competed in this event.

Union County fared exceptionally well in the state championship event, taking the first six places among the first eleven. Among the Union County place winners in addition to the champion were: Russell Simmons, Plainfield, second place; Victor Converso, Kenilworth, 3rd place; John Findra, Sr., Plainfield, 4th place; Walter Marienschek, Plainfield, 5th place; Harold Sauer, Linden, 6th place and Donald Schwencke, Linden, 11th place.

Indiana

Dr. A. L. Evans has been elected president of the newly organized Northern Indiana Gas Model Association. Headquarters of the club have been established at 4490 Broadway, Gary, Indiana, and meetings are held here every Thursday at 9 P.M. The club intends to put on the Northern Indiana Championship Meet on Sunday, September 18th, at a field at 49th and Georgia, Gary, at which the gas model champion of northern Indiana will be determined. For further information concerning club activities write to Mr. Bob Roberts at club headquarters.

Virginia

We hear from Lloyd C. Weygint, secretary of the Tidewater Gas Model Association. He says:

"The Tidewater Gas Model Association recently held election of officers. These are as follows:

President.....Sam Hinkle
V. President.....Francis Driesback
Secretary-Treasurer.....Lloyd Weygint
Ass't. Sect.-Treas.....Jerry Lowe
Sergeant at Arms.....Eric Jens

"We have recently displayed our handicraft at the Y.M.C.A. Norfolk Hobby Show, and succeeded in taking third prize for the best group display. This was not as good as 1937 when we placed first, but we are already planning on the coming year and hope to walk away with all the best prizes.

New Mexico

Lee Erlandson of No. 16, 203½ West Central, Albuquerque, New Mexico, writes us some news from his section of the country.

"The Albuquerque Gas Model Association (A.G.M.A.), Y.M.C.A., now boasts 20 active members and one regular member. Active members are those who have gas models and who have paid 75c entrance fee. Regular members are those who have not yet started on their gas models. Regular members only pay 25c entrance fee until they start their model, and then add 50c to this amount. This club started out in September, 1936 with five members.

The 18th member is Billy Van Buskirk of Santa Fe, who joined in order to be eligible to enter any of the Albuquerque Contests.

Washington

Miss Nancy Kreidler, secretary of Unit 57 N.A.A., located at Yakima, Washington, with headquarters at the Y.M.C.A. writes as follows:

"The Yakima Gas Model Club, Unit 57 of the N.A.A., has just undergone a complete reorganization with a new president, Charles Lamb, Jr.; vice-president, Ray Parkes; sergeant-at-arms, George McLaughlin; and secretary-treasurer, Nancy Kreidler, the only girl member. Dick Megorden, former president, has been on a northwest tour organizing gas model clubs, and his official capacity is that of senior advisor to the club. All members not actively building or attending meetings were ruled out, leaving on active N.A.A. membership at 48.

Washington

Lloyd Owens, corresponding secretary of the Seattle Chapter of the N.A.A., 4552 West Othello Street, Seattle, Wash., writes us:

"The summer contest program of the Seattle Club started very successfully on June 5th with a contest at Fort Lewis, Washington. This was the last of two contests to decide the Northwest Champion; the first contest being held at Yakima in May. The winning performance was made by Glen Chambers of the Yakima Valley Club. The winning model was a beautiful "planked" ship with a high wing powered by a Brown Junior. The outstanding part of the ship was its consistent performance; it flew well in the Yakima two-event meet and in both events at Fort Lewis.

California

More than a thousand gas model fans gathered for the third annual Chancellor Midget Air Races, held at Fleishman polo grounds, Santa Barbara, California, on June 25th. The affair was definitely a precision contest. Planes were graded on their ability to take off, climb and glide to earth as close as possible to the point of departure. First prize of $50 and a thirty-inch gold trophy went to Mel Farrell, 35 years old, of Glendale. Farrell's plane was a 4½ foot red, high-wing racer powered with a Denny motor. It was judged on its appearance and

5" ALUMINUM COWLING
with each Stinson SR9 or Mr. Mulligan

2 GIANT GUARANTEED FLYERS
Giants in Size—Giants in Value

5 ft. Mr. Mulligan, 54" Stinson Gull Wing

Two complete kits in every detail. Packed in a large 30" box.

DUPLEX ENDURANCE
another Capitol Sensation

2-43" contest endurance models for the price of **1.** Both guaranteed to fly a mile.

FEATURING: Bamboo paper, free wheeling, wire landing gear, special endurance propeller and many other features.

BOTH MODELS FOR $1, PLUS 20c POSTAGE

SPECIAL OFFER—With Duplex kit only. 75 ft. of contest endurance rubber plus a large bottle of the finest lubricant.....only 50c.

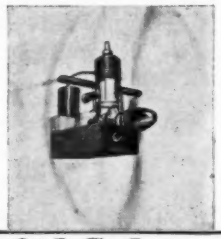
JOBBERS and DEALERS—Write for our discounts on the above kits and our quality wholesale supplies.

CAPITOL AIRCRAFT & SUPPLY CO.
298 A Rogers Ave. Brooklyn, N. Y.

Accent on Beauty

Utility Too!

New STREAMLINED Highly Polished Gleaming Brass EXHAUST MANIFOLD



ONLY **$1.00** Post Paid For All Models Brown Jr. and Mighty Midget Engines

Special Sale

For Limited Time Only

POLKS PERFECT PITCH PROP..... $1.50
Solid Aluminum Threaded Spinner..... .60
BOTH FOR ONLY $1.35 $2.10

P.P.P. PROPS have been acclaimed the world's best! Precision carved of high grade seasoned maple, balanced and beautifully finished. Truly designed specifically for Each Engine. Look for the trade mark on Genuine PPP Props.

BERRYLOID **CEMENT**
In a handy pointed nozzled 4 inch tube with cap.
5c and 10c add 3c postage
LIBERAL DISCOUNTS

WHY LOSE YOUR SHIP?

It is more fun to make short hops! All official contests limit your engine run. Play safe, and use our PRECISION CONTEST TIMER. Weighs 2 oz. Has own snap action switch, can be mounted in any position, adjustable from 0 to 55 seconds. **$2.00** Post Paid Complete with mounting screws.....

DE LUX PRECISION SUPERLITE MODEL wt. 1 oz.....$2.50

MODEL AERONAUTICS **YEAR BOOK**
By Frank Zaic
• 112 Plans • 26 Articles • 1001 Ideas
$1.00
You can't do without it! Order from POLK'S

G R ENGINE REPAIR SERVICE

All engines Guaranteed & Rejuvinated. Thoroughly overhauled, rewired & adjusted by certified experts, $1.25. Extra charge for replacements. Complete stock of repair parts for all engines.

DEALERS: You can handle all these hot items profitably. Write:

POLK'S MODEL CRAFT HOBBIES, INC., 421 Seventh Ave., 33rd St. Entrance 2nd floor NEW YORK CITY

workmanship as well as performance. We are indebted for this information to James O. Hazard, secretary, Silver Falcon Society of Santa Barbara, Cal., P.O. Box 715.

Notices

We have received a notice from a dealer, Greens Service in Washington, D.C., to the effect that an Ohlsson motor No. J-1632 has been stolen from his store. Should anyone happen to receive any information on this motor, we would appreciate it if he will notify MODEL AIRPLANE NEWS, 551 Fifth Avenue, New York City.

We also hear a pusher gas model body containing a Cyclone motor No. D-5371, timer, prop, wheels, etc., belonging to Bill Bloom, 107 South Starr Avenue, Burlington, Iowa, was stolen from the hangar at Wayne County Airport during the Nationals. Bill hopes that the fellow is suffering from a guilty conscience and will return it—or if not, that the "finder" at least has as much trouble with the thing as he did.

A VARIETY FOR YOUR SELECTION

Gas Kits from $2.75 Up

Megow, Cleveland, Berkley, Comet, Denny, Ideal, Peerless, International, Scientific and Burd.

Motors from $9.50 Up

Brown, Denny, Syncro, Bunch, Ohlsson Forster, Brat, Husky, Trojan, Elf, Condor and Pee Wee.

Special this month only

A Buccaneer Standard with Model "D" Brown and Air Wheels $15.00.

MORRISTOWN HOBBY SHOP

78 Park Place Morristown, N. J.

Postage Prepaid on orders over $5.00

News reaches us that the first annual open meet of the Queen City Gas Model Club of New Jersey will be held at Hadley Airport, N.J., on September 17th, 1938. This meet will be run under N.A.A. rules and all entries must be N.A.A. licensed. Applications and information concerning the meet may be had by writing to Frank Boyd, Queen City Gas Model Club, 1800 Myrtle Avenue, Plainfield, New Jersey.

Correction

In the August issue of MODEL AIRPLANE NEWS an error was made in the spelling of the name of the winner of the gas event at the Michigan State contest. It was spelled as "John Baruska." The correct spelling is John Maruska.

N.A.A. News

(Continued from page 28)

Towline Rules conform to the three ounce per 100 square inch wing loading rule.

That the $L^2/200$ minimum cross-section fuselage rule and require that a glider resemble a man-sized aircraft be adopted.

That the towline should not exceed 100 feet and there shall be three official flights.

It is proposed that the rules for hand-launched gliders shall allow nine flights, no delayed flights, and that they shall weigh two ounces per 100 square inches.

Gas Models

It has been suggested that wing loading is too light.

It has been suggested that the present weight limit of seven lbs. be increased.

That there be no wing loading rule and the wing span be limited to seven feet.

That due to the very large number of entries in official contests there will be allowed only two official, and no delayed flights permitted.

That only two minutes be allowed for starting the engine on the flying runway when timer is waiting.

That there be a separate midget-

!VALUES!

"FAR IN EXCESS OF OUR PRICES"

FREE ON ORDERS of $1.00 or More

Choice of One of These Special Offers

No. 1 Celluloid Motor (1) any size listed. 5 Sheets Jap. Tissue.

No. 2 Two any size Prop. Blocks (6) 1/16x1/4x15 Bamboo, 30 Shredded and 2 pair any size Birch Wheels.

36" GRADE A BALSA STRIPS
1/16x1/16, 100. .10
1/16x1/4 35 for .10
1/16x3/16, 18, .10
1/16x1/4 15 for .10
1/16x1/2 5 for .10
3/32x3/32 30, .10
1/8x1/8 30 for .10
1/8x3/16 15 for .10
1/8x1/4 10 for .10
3/16x3/16 8, .10
1/4x1/4 6 for .10
1/4x3/8 4 for .10
1/4x1/2 3 for .10
1/2x1/2 2 for .10

36" BALSA SHEET
1/32x2 2 for .05
1/16x2 2 for .05
3/32x2 1 for .03
1/8x2 3 for .10
3/16x2 1 for .05
1/4x2 1 for .05
1/2x2 1 for .09

BALSA PROP BLOCKS
1/8x3/4x5 8 for .05
1/8x3/4x6 7 for .05
5/8x1x7 4 for .05
5/8x1x8 3 for .05
3/4x1 1/4x10 2, .05
3/4x1 1/4x12 3c ea.
1x1 1/2x12 4c ea.
1x1 1/2x15 6c ea.

18" BALSA PLANK
1x1..... .05
1x1 1/2..... .09
1x2..... .10
1x3..... .15
2x2..... .18
2x6..... .35
18" lengths of Balsa may be had for half price of 36".

PAUL O WINA Standard Props
5"..... .07
6"..... .09
7"..... .11
8"..... .14
9"..... .19
10"..... .22
12"..... .35
15"..... .45

CEMENT—DOPE
1 oz. Bottle..... .04
2 oz. Bottle..... .08

THINNER
1 oz. Bottle..... .04
2 oz. Bottle..... .08

CELU. MOTORS
1 1/2"..... .09
2"..... .13
2 1/2"..... .15
3"..... .17

BROWN RUBBER
1/8", 18 ft..... .05
3/16", 12 ft.... .05

TISSUE "A.A."
All Colors 3 for .05
Silver 1 for .04

STRAIGHT WIRE
.020, .028, .034, 6 ft. for..... .03

BAMBOO
Shredded 36 for .05
1/16x1/4x15, 7 for..... .05

REED
1/32" 1/16" 1/4" Diam. 5 ft. for .02

WASHERS
1/8"—1/4" 12 for .01

ALUMINUM TUBING Per Ft.
1/16" O D.... .06
3/32" O D.... .10
1/8" O D.... .13
3/16" O D.... .14
1/4" O D.... .15

SHEET CELLULOID
6"x8"..... .10
12 1/2"x16"..... .25

THRUST BEARINGS
Small ..... .01
Large, 2 for..... .03

PLASTIC BALSA
1 oz. Bottle.... .04
2 oz. Bottle.... .08

BUSHINGS
Large 1/8" 4 for .01
Small 1/16" 5 for..... .01

RUBBER LUBRICANT
Large Bottle. .10

COLORED DOPE
Any Color..06 oz.

SCRAP BALSA
Large Bundle, All Useable 35c each

MACHINE CUT PROPELLERS
5", each..... .04
6", each..... .04
7", each..... .05
8", each..... .06
9", each..... .07
10", each..... .08
12", each..... .10

WHEELS (PR.)

	Blr.	Bal.	Cel.
1/2"	.01	.03	
3/4"	.02	.04	.05
1"	.03	.05	.07
1 1/4"	.04	.06	.09
1 1/2"	.07	.09	.15

STEEL PINS
Large package .05

BALSA WHEEL PANTS

For	Pr.
1/2" wheels..	.10
3/4" wheels..	.10
1" wheels.....	.12
1 3/4" wheels	.15
1 1/8" wheels	.18

DOWELS
1/4"x36"..... .05
3/16"x36"..... .06
1/4"x36"..... .08

DEALERS — CLUBS
Send For Special Prices

24" Mr. Mulligan Kit .50
24" Stinson Kit..... .50
24" Waco Kit..... .50

ORDERING INSTRUCTIONS—Cash or Money Order. No checks—no stamps—no C.O.D. All orders over $1.50 sent prepaid; under $1.50 add 10%. Foreign add 20% on all orders.

GAS SUPPLIES

BALSA Specially Selected
All hard unless otherwise specified. For Five Foot lengths double 36" prices. Sizes from 1/8" sq. on. No Gas Orders less than $1.00. Add 15% for Packing and Postage on all Orders.

MOTORS (All Motors Sent Prepaid)
BROWN JR. Ohlsson, $18.50
Model D, $10.00 Trojan, 18.50
Model C, 17.00 (Uprights)
Model B, 21.50 Mighty Midget, 9.50
Gwin Aero, 12.00
Special Gas Model Cement, Dope Pint..... .55

Send for Additional Prices on Gas Supplies and Accessories

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32-57 38th St. Dept. N, Long Island City, N. Y.

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MODEL AIRPLANES—KITS—SUPPLIES

DEALERS, Clubs, Schools: Send for low, complete wholesale list, including gas model supplies. Save money. Model Airplane Utility, 5307 New Utrecht Ave., Brooklyn, N.Y.

DEALERS, Jobbers! Real profits on model supplies. Stamp brings new wholesale list. Modelers write for free retail list. Waterbury Model Builders Supply, 131 Cherry St., Waterbury, Conn.

127 120 116 films enlarged 4x6 35c complete. Send for price list and discounts on film and supplies. Star Photo, New Britain, Connecticut.

GAS Model Specialties—314 Second North, Syracuse, N.Y. —New Super-Catalogue lists everything for gas models. Get your Free copy today. Join the GMS parade.

FREE—10 feet brown rubber with price list. Covers rubber and gas supplies. Northwest builders get orders in two days. Capital City Model Shop, 71 E. Arch at Jackson, St. Paul, Minn.

BROWN AERO RUBBER—Hodgman Rubber Company, 261 Fifth Avenue, New York City. Chicago office: 412 South Wells Street. Dealers and manufacturers only.

NEW in Models. Flying, Scale Model of Sikorsky S-43 Amphibion with 21½" wing span—Army Colors. Complete kit $2.75 postpaid. Model Aircraft, P.O. Box 149, Fairfield, Conn.

26" to 32" monocoupe, Stinson, Waco, Mulligan, Seahawk, balsa cowl included, 65c each postpaid. 50" to 60" Flyers —Aeronca, Taylor Cub, Stinson, Fairchild, Mulligan, Rearwin—$1.15 each postpaid. Lehr, 176 Forsyth St., N. Y. C.

NIBOR S'NAGIRROC—Three foot, super detail flier, $1 postpaid. Four foot gasoline model, $4. Sturdibuilt, Cully Blvd., Portland, Oregon.

GAS Model Props, 30c, 4 for $1.00. Dealers write. Gumwood, Bass, Birch or Mahogany. Smith, 4645 Elm Court, Denver, Colorado.

BUILD a Radio Controlled Airplane, a thrilling, interesting sensation. Send for free booklet on Radio Control and Model Supplies. Bulletin 212, Radio Aircraft Company, 189 Utica Ave., Brooklyn, N.Y.

GAS model propellers, true pitch, accurate balance, beautifully finished. 12½" to 15" only 30c each. Leslie Griswold, 5 Kinlock St., Milford, Conn.

powered model rule.

That there be a classification for pay loading for a model competition.

That there be an event for precision or performance for powered models.

That the wing loading rule remain at 8 ounces per square foot.

That the 30 sec. motor run is satisfactory.

That the engine run rule be reduced to 20 seconds.

A new midget class for powered models of not over 300 square inches operating on an 8 ounce wing loading rule be adopted.

That the rules regarding the contestant being the builder and owner of the model be modified and waived to permit a person to compete with a model which has been built by someone else.

That there be a separate classification for rules for Powered Scale Models.

That the cubic displacement of the engine in relation to the weight of the model be considered a factor in powered model rules.

That there be five official flights with no delayed flights permitted.

That pushing of the models be permitted on the take-off.

Contest Rules

It has been proposed that separate National Meets be held for gas and rubber powered models.

That there be specific days for gas model events only and separate days for rubber powered events.

Please be specific in your answers and questions where a yes or no is required, fill that in. Where an opinion or suggestion is required state it as briefly as possible.

Results Of Questionnaire

Issues at this year's Nationals

The following are the compilations of the questionnaire issued in the contestant's envelopes. Only 27% of the questionnaires were returned, and these results were derived from this percentage, giving us a fair cross section of the opinions of the contestants.

Would you like an 8 oz. rule (92) 10 oz. (60) 12 oz. (13).

Should this apply to models powered with new midget engines? Yes (63) Not (81).

What do you think of having wing area sub divisions for power models? Yes (81) No (50).

Would you recommend a separate ruling for small gas models? Yes (104) No (47).

Would you enter an exhibition scale model event if one was held? Yes (46) No (121).

Fort Worth Stages Successful meet

With fifty-two model planes entered, the annual meet of the Fort Worth Gas Model Association, held at the Texas city on June 12th, was an outstanding success. More than 1200 spectators jammed the field.

Top honors went to Bob Rutledge, whose Modified Buccaneer stayed up 3 minutes, 50.5 seconds. Second place was taken by Ed Martin, flying the "Miss America," with a time of 3 minutes, 26.5 seconds. Sid Smart, third place winner, set a mark of 2 minutes, 49.5 seconds.

The first prize was a silver loving cup and $20 presented by the meet sponsor, Inter-state Theaters. Others were cash prizes ranging from $15 to $5.

The Roving Trophy, a silver loving cup, was won in the Jimmie Allen Speed Race by Claude Green. Green's plane carried a passenger—a horned toad—who "bailed out" at about 50 feet and made a safe landing.

E. E. Bennett was the contest director.

Tri-State Contest

We hear that the Tri-State Model Association will hold their first annual Tri-State Model Airplane Championships on September 24th at the Pittsburgh-Butler Airport. The meet will be sanctioned by the N.A.A. and run under the following rules:

Events Scheduled: 1. Gas Models—Fuselage Type—a. Senior Class—30 second motor run. b. Open Class—30 second motor run. 2. Rubber Powered Fuselage Models—100 to 300 sq. in.—a. Contestant under 21 years of age. b. Contestant 21 years of age and over.

Prizes to be awarded: The first place winners in the gasoline model events will receive trophies and valuable merchandise. The next five contestants to place will receive merchandise awards.

The contestants placing first to fifth in the rubber powered events will receive valuable merchandise awards.

NOTE: The number of contestants receiving prizes will be based upon the number of entries but in no case will there be less than those stated above.

PROPELLERS

- ANY QUANTITY
- FINEST BALSA
- TRUE PITCH
- 4" to 16" DIAMETER

Manufacturers of model airplane kits as well as model builders, are now assured of an unfailing source of supply for propellers of any size or quantity. Comet's Supply Division is prepared to produce Balsa propellers of absolutely true pitch, cut to the highest precision standards, on short notice. Volume production assures lowest prices. Let us quote you on your needs.

WRITE on Letterhead for FREE SAMPLES and LOW PRICES

COMET TIMER FOR GAS MODELS!

Amazing new timer. Simple, foolproof. Adjustable 10 to 50 seconds. Ready to install—each timer complete with directions in attractive carton. Weight ⅛th ounce. Patent pending. Write for further information. Price only.....50c

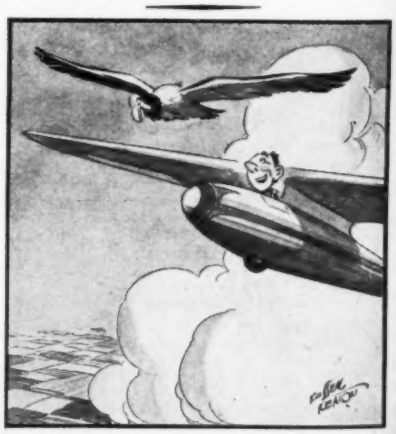
SUPPLY DIVISION

COMET MODEL AIRPLANE and SUPPLY COMPANY

2509 CERMAK RD., CHICAGO, ILL.
688 BROADWAY, NEW YORK

The wing loading of gas models must be 10 oz. per square foot and for rubber powered models 3 oz. per 100 square inches of projected wing area. Maximum weight of gas models 7 pounds.

Rules, regulations and entry blanks may be secured from: TRI-STATE MODEL ASSOCIATION, 524 Griffin Street, Pittsburgh, Pa.



"Swell up draft, ain't it?"

THE GAS MODEL THAT MADE GOOD!

THE COMET *New Clipper*

Designed by

CARL GOLDBERG

REMOVABLE FRONT END!

Everyone who has seen this clever stunt says it's amazing! Motor, battery and coil, mounted in one unit which is instantly detachable. Cowling quickly removed for adjustments.

1. Wingspan, 6 ft.; Length, 53½ in. Weight (ready to fly) 2 lbs., 5 oz. Wing Loading, ½ lb. per sq. ft. Double elliptical wing—tapered section—highly efficient.
2. New Comet automatic timer included free. Weight less than 1 oz. Adjustable 10 to 50 seconds. Tapered Spars, Ribs die cut, Shock-Absorbing Bent Music Wire Landing Gear with Streamlined Fairing; Semi-carved propeller. All wire and metal Fittings furnished.
3. Many finished and semi-finished Fittings: Full size three-view Plans with full size Patterns: Bamboo Paper: Generous quantities of Cement, Banana Oil, Red and Light Blue Dope. Special light weight wheels.
4. "How To Adjust and Fly Gas Models," written by Carl Goldberg, given with each kit. 28-PAGE COMET CATALOG. 5c at your dealer!

A CONSISTENT PRIZE WINNER!

We knew that the Comet Clipper was going to be a prize winner. After all, it was designed by Carl Goldberg himself, and in hundreds of tests it had proven its amazing flyability. But this sensational gas model has done even better than we expected. It took second prize at the Nationals in Detroit; came in first in a recent contest in Chicago, another one in Atlanta, Georgia—and we keep getting letters from model builders telling us of other prizes throughout the country. There are mighty good reasons why the Comet Clipper is such a consistent winner—why not find out these reasons for yourself by building one soon? You'll like the removable motor and battery unit—the instantly detachable wings and tail, which come off in the event of unusual shock, preventing damage; the rapid rate of climb—and lots of other features!

Kit No. T7—COMET CLIPPER. Price including Comet Automatic Timer..... $4.95

Comet Clipper Kit with air wheels.....$6.50

Postage 25c, none if ordered from dealer. Above prices are less motors. Ohlsson motor for above, $18.50. Brown Jr. motor.....$10.00

GAS MODEL PROPELLER

A scientifically designed, beautifully finished propeller for gas models. 14" diameter. 8" pitch. Perfectly balanced. In black or red finish, 60c. In natural finish..... **50c**

GAS MODEL FLOATS

Weigh no more than the air wheels they replace. Instantly interchangeable. Can land on ground as well as water. Suitable for models weighing up to 5 lbs. Kit No. T9, price..... **$1.00**

COMET MODEL AIRPLANE & SUPPLY COMPANY

2509 West Cermak Road, CHICAGO . Dept. MN10 . Eastern Branch: 688 Broadway, NEW YORK

COMET maintains distributors in many cities throughout the United States and other parts of the world. Foreign distributors include: F. P. Sweeten, Blackpool, England; R. W. Hill, Capetown, South Africa; E. J. Hyams and Son, Wellington, C. I., New Zealand; Swift Model Aircraft Co., Brisbane, Queensland, Australia. PACIFIC COAST DISTRIBUTORS: Edw. Kapitanoff, 4649 Prospect Ave., Los Angeles, Calif; Smalley Paint and Paper Co., 5300 Ballard Ave., Seattle, Wash.

GAS-POWERED MODELS OF THE CHAMPIONS!

MEGOW'S

Gas-Powered QUAKER FLASH!

Roland Fischer of Denver, Colorado and his World's Champion "Quaker Flash"

Built as a STOCK Model . . . it wins the World's Record!

MEGOW models these days are really "going places!" In winning the world's championship flight at Denver, the QUAKER FLASH becomes the first STOCK model ever to become a champion. Again at the Tri-State Contest at Pittsburgh in May, another QUAKER FLASH established a verified flight record of one hour and 37 minutes—unofficial only because of a few seconds motor overrun.

Maxwell Bassett, pioneer gas-model builder and his new sensation designed for Megow's.

QUAKER FLASH!

$4.95 plus 20c postage

The big champion among all gas-powered models. Easy to build—2 full-size plans, 28" x 34" and 5 clear photos. Cutout propeller, ex. hard Balsa wood, special steel wire, sheet aluminum for cowl and all necessary supplies. Uses any model airplane motor. Wings removable and gear folds back for carrying. 3½" puncture-proof wheels. Wingspan 67"; length 47"

New Sensation!

$3.95 plus 20c postage

New, small type, light weight, practically crackup-proof model designed by Maxwell Bassett, pioneer gas-model builder. The most complete in its field. Ready-to-use propeller, all metal parts die-cut, special rubber wheels. Tested in actual flying for nearly a year. Uses any small motor with approximately ⅞" stroke and bore. Wingspan 48"

GIANT FLYING 50" MODELS with Motor-Hum Device!

Rubber-powered scale models designed for long, stable flights and flat glides. Big, colorful, equipped with motor-hum device. For size, light weight, strong construction and design they reach a "new high". In addition to those shown here, there is also a WACO at $2.00; a 60" STINSON RELIANT at $1.50; AERONCA K at $1.00; and FAIRCHILD RANGER at $1.00. See your dealer or any kit will be mailed for 15c additional for postage.

REARWIN SPEEDSTER
$1.00 plus 15c post.

MONOCOUPE
$1.25 plus 15c post.

TAYLOR "CUB"
$1.00 plus 15c post.

HOWARD DGA8
$1.25 plus 15c post.

MODEL AIRPLANES, SHIPS, RAILROADS

Send for Catalog today!

Send 5c for the largest, most complete catalog we have ever issued. 94 pages, illustrating scores of model airplanes, ships . . . and the NEW MEGOW HO GAUGE RAILROADS. Also ready-made parts and supplies for all model-builders.

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